A study on the link between Corporate Environmental Sustainability Performance and Sustained Financial Performance for large Indian Companies

A THESIS SUBMITTED TO

THE UNIVERSITY OF TRANS-DISCIPLINARY HEALTH

SCIENCES AND TECHNOLOGY

FOR THE AWARD OF THE DEGREE OF

DOCTOR OF PHILOSOPHY

BY

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UNDER THE GUIDANCE OF

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Declaration by the Candidate

I declare that this thesis, entitled "A Study on the Link between Corporate Environmental Performance and Sustained Financial Performance for Large Indian Companies", submitted for the award of Doctor of Philosophy to THE UNIVERSITY OF TRANS-DISCIPLINARY HEALTH SCIENCES AND TECHNOLOGY, Bengaluru, is my original work, conducted under the supervision of my guide, Dr. Atul Kumar Gupta. I also wish to inform you that no part of the research has been submitted for a degree or examination at any university. References, help, and material obtained from other sources have been duly acknowledged.

I hereby confirm the originality of the work and that there is no plagiarism in any part of the dissertation.

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CERTIFICATE

This is to certify that the work incorporated in this thesis, "A Study on the Link between Corporate Environmental Performance and Sustained Financial Performance for Large Indian Companies," submitted by **Anju Ahuja**, was carried out under my supervision. No part of this thesis has been submitted for a degree or examination at any university. References, help, and material obtained from other sources have been duly acknowledged. I hereby confirm the originality of the work and that there is no plagiarism in any part of the dissertation.

Research Supervisor

Dr. Atul Kumar Gupta

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List of Acronyms

Acronym	Full Form
BRR	Business Responsibility Report
BRSR	Business Responsibility and Sustainability Report
CAGR	Compound Annual Growth Rate
CDP	Carbon Disclosure Project
CESP	Corporate Environmental Sustainability Performance
CSR	Corporate Social Responsibility
EC	Energy Consumption
EI	Energy Consumption Intensity
ESG	Environmental, Social, and Governance
FMCG	Fast-Moving Consumer Goods
GE	GHG Emissions
GHG	Greenhouse Gas
GI	GHG Emissions Intensity
GRI	Global Reporting Initiative
IIRC	International Integrated Reporting Council
ISSB	International Sustainability Standards Board
NSE	National Stock Exchange

Acronym	Full Form
ROA	Return on Assets
ROE	Return on Equity
SASB	Sustainability Accounting Standards Board
SBT	Science-Based Targets
SDG	Sustainable Development Goals
SEBI	Securities and Exchange Board of India
SFP	Sustained Financial Performance
TBL	Triple Bottom Line
TQ	Tobin's Q
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WC	Water Consumption
WCED	World Commission on Environment and Development
WI	Water Consumption Intensity
WWF	World Wide Fund for Nature

Acknowledgements

This thesis has been a long journey shaped by steady effort, sharp minds, and the kindness of people I have been lucky to have around me.

I owe a deep thank you to my supervisor, Dr. Atul Kumar Gupta, for his sharp insight, patient guidance, and quiet confidence in this work.

I am also grateful to my doctoral committee, Dr. Rudrodip Majumdar and Dr. Joy Mukhopadhyay, for pushing me to think harder, refine better, and stay rigorous. Your feedback truly inspired how this research grew and took shape.

To my family, Dipankar, Charu, and Chitra, thank you for being my steady ground. You have cheered me on, carried the weight with me, and reminded me of the bigger picture.

I would also like to acknowledge the behind-the-scenes support that made all the difference, Mr. Ravi Kumar G., for helping me navigate the system with ease, and the Transdisciplinary University for giving this work a strong base—a special thanks to the external examiners for your time, effort, and valuable contributions.

This work reflects the collective investment of time, knowledge and encouragement I have been fortunate to receive. Finally, thanks to everyone whose work I've built on, whose time and help I've taken, and whose kindness has carried me to this milestone.

Abstract

This thesis examines the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) among the 30 largest Indian companies over a five-year period from 2018-19 to 2022-23. The objective of the study is to evaluate the link between improvements in corporate environmental sustainability performance and sustained financial performance, as represented by growth, profitability, efficiency, and market valuation.

The research combines quantitative analysis with qualitative insights from industry reports and company disclosures. CESP includes environmental indicators, such as carbon emissions, water intensity and energy usage intensity. Financial performance is evaluated using Revenue growth, Return on equity (ROE), return on assets (ROA), Price-to-book ratio, and Tobin's Q.

The findings indicate a positive correlation between strong environmental performance and financial outcomes in high-sustainability companies. The study also examines sectoral variations, highlighting that the financial linkage of CESP is more pronounced in high environmental sensitivity, capital-intensive, and resource-dependent sectors, such as Chemicals, Oil and gas, and Cement.

This research underscores the strategic importance of integrating environmental responsibility into business models, not as a reactive or compliance-driven action plan, but as a catalyst for long-term business success. The study offers a Framework for analysis and directions for future research on corporate sustainability practices. The study provides strategic recommendations for

corporate leaders and policymakers to strengthen the alignment between sustainability outcomes and financial performance.

Keywords: Corporate Sustainability, Environmental Sustainability, ESG, Sustained Financial Performance, SDG.

1. Introduction

Sustainability is becoming an increasingly important aspect of modern business strategy, driven by growing environmental concerns and stakeholder pressures. Businesses are no longer mainly responsible to the owners or shareholders for their financial bottom line. Instead, they are now accountable for reporting on the triple bottom line. Sustainability comprises various dimensions, including environmental, social, and economic outcomes. (Elkington, 1998). Businesses must manage the environmental impacts and community concerns arising from their activities to ensure long-term viability and credibility.

1.1. Background

Sustainable development emerged as a global priority after the International Union for Conservation of Nature (IUCN), along with the United Nations Environment Programme (UNEP) and the World Wide Fund for Nature (WWF), introduced it in its “World Conservation Strategy” (IUCN,1980). This document set the framework for development by maintaining natural resources while pursuing economic growth and social equity. The World Conservation Strategy focused on ecological sustainability and human progress and highlighted the need to preserve depleting natural resources to ensure long-term development goals.

This strategy document set the stage and influenced the publication of the Brundtland Report, O*ur Common Future*, by the United Nations World Commission on Environment and Development in 1987. The Brundtland report came up with the definition of sustainable development: "development that meets the needs of the present without compromising the ability of future

generations to meet their own needs" (Hinrichsen, Don, WCED, 1987). This definition balances economic growth, social equity, and environmental protection. These are known as the three pillars of sustainable development.

1.2. Environmental Sustainability

Environmental sustainability includes the following initiatives (EPA, n.d.; Sachs, 2015; UNEP, 2021):

- Reducing Emissions through measures to reduce greenhouse gas emissions by adopting cleaner technologies, improving energy efficiency, and utilising renewable energy sources.
- Resource Conservation, including efforts to conserve water, reduce waste, and recycle materials used by them.
- Sustainable Supply Chains to ensure that partners and suppliers adhere to sustainable practices

Environmental sustainability and climate change are deeply interconnected. Climate change, driven primarily by greenhouse gas emissions from energy use, land degradation, and industrial activity, directly threatens the stability of ecosystems and human societies (UNEP, 2021).

Climate change impacts

Climate impacts affect health through air pollution, disease, extreme weather events, forced displacement, mental health pressures, and malnutrition in regions where people cannot grow or find enough food.

Every year, environmental factors result in approximately 13 million deaths. Fossil fuels - such as coal, oil, and gas - are the primary cause of global climate

change. Fossil fuels are responsible for more than 75% of global greenhouse gas emissions and nearly 90% of all carbon dioxide emissions (United Nations Climate Change website). The production of electricity and heat through the combustion of fossil fuels releases carbon dioxide and nitrous oxide. Emissions from manufacturing and industry primarily arise from the burning of fossil fuels for energy, as well as from activities such as mining, cement production, iron and steel manufacturing, electronics, plastics, clothing, and the production of other goods. The manufacturing industry is one of the most significant contributors to global greenhouse gas emissions.

Water and climate change are closely interconnected. Extreme weather events make water scarcer, unpredictable, or polluted, or all three (S.K. Das et al., 2024). These impacts across the water cycle threaten sustainable development, biodiversity, and people's access to water and sanitation. Companies are becoming aware of the negative impact of environmental degradation and climate change and their role in addressing these global challenges.

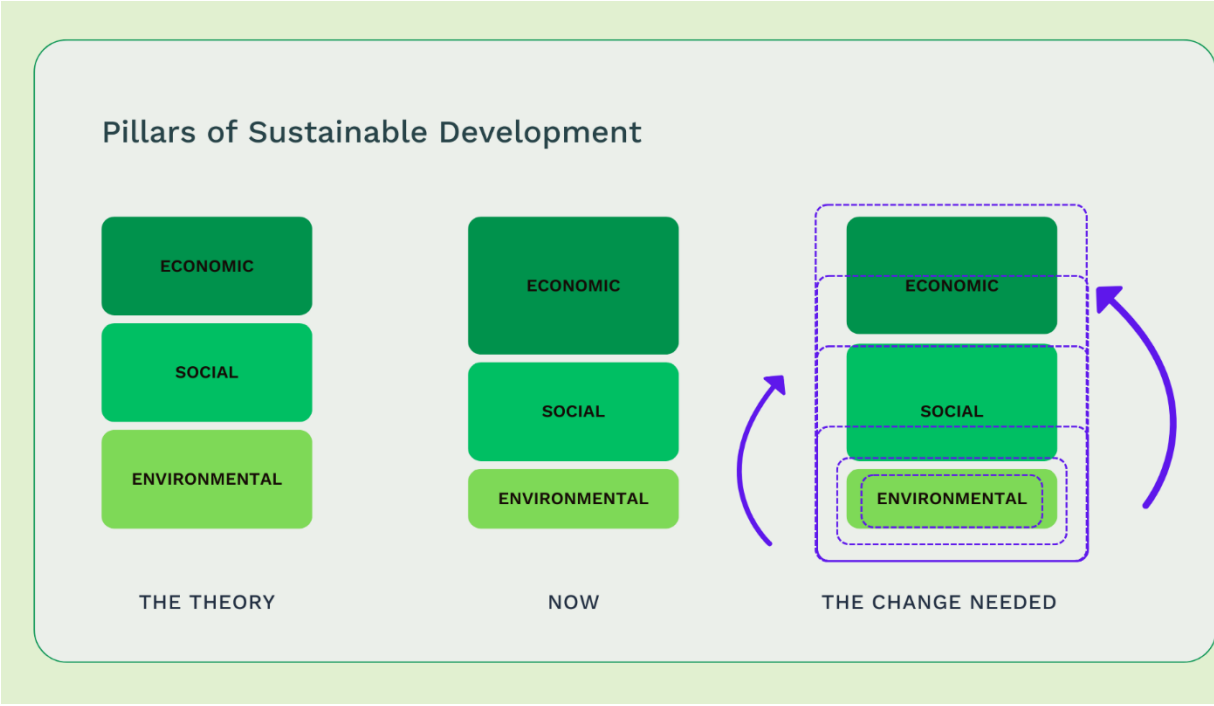
Pillars of Sustainable Development

Sustainable development was initially portrayed as a Venn diagram consisting of three interconnected spheres: society, economy, and environment, where all three pillars were seen as of equal importance. However, the environmental pillar is being neglected due to the emphasis on economic and social aspects, which is a common situation in practice, but not how it was designed for ‘sustainable development’ (IUCN 2006).

Figure 1.1 illustrates the evolution of the understanding and implementation of sustainable development, mainly how the three pillars—economic, social, and

environmental—interact. (*The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century (IUCN 2006) Report of the IUCN).*

Figure 1.1. Pillars of Sustainable Development.



The figure highlights the need to strengthen environmental considerations to achieve a more balanced and practical approach to sustainability in all its facets.

The economy is a product of a society that exchanges goods and values and encompasses society. The society incorporates the economy as one of its parts. However, the environment is separate and distinct from humanity, and societal structures cannot build or regulate it. These gaps need to be addressed when talking about the trade-offs in sustainability. (IUCN 2006). (Adams, n.d.)

1.3. Corporate Sustainability

The World Commission on Environment and Development (WCED) has asserted that achieving sustainable development was not the responsibility of government regulators and policymakers alone. The business activities have contributed to unsustainable usage of resources, and corporates have a shared responsibility for future sustainable development. (*Our Common Future*, WCED,1987).

Businesses need to integrate sustainable development goals in their operations and balance economic development, social equity, and environmental protection. The environmental, social, and governance (ESG) aspects are important, along with the economic dimensions.

Corporate Environmental Sustainability involves reducing a company's environmental footprint by managing waste, conserving natural resources, and minimising the negative impacts of climate change. This includes a reduction in greenhouse gas emissions, energy efficiency, conserving water resources, and promoting renewable energy use.

Corporate Social Sustainability involves fair labour practices, community development, and ethical business practices. This involves taking care of diverse stakeholders, including the well-being of the employees, the local community, and society.

Corporate Economic Sustainability focuses on long-term profitability, business resilience, and economic growth without compromising environmental or social responsibilities (Elkington, 1998).

Business and Sustainability

Many companies focus on sustainability practices due to external pressures or to ensure compliance with regulatory requirements. Sustainability practices can enable operational savings through energy efficiency, waste reduction, and resource usage. The benefits of embracing sustainable practices include enhanced company reputation, increased market share and investor interest (Eccles, Ioannou, & Serafeim, 2014). The focus on sustainable practices also reduces risks associated with regulatory changes and environmental impacts.

Corporate Environmental Sustainability Performance (CESP), as used, is a composite term that integrates multiple dimensions of corporate environmental outcomes into a single evaluative concept. The present research synthesises the operational indicators and framing into a structured construct—CESP—to evaluate how comprehensively and effectively companies manage their environmental sustainability objectives. This thesis uses CESP as a consolidated metric encompassing emissions intensity, energy intensity, and water intensity, offering a clear and comparable framework to study corporate environmental behaviour across firms and sectors.

Past researchers, such as Eccles, Ioannou, and Serafeim (2014), examine corporate sustainability performance by analysing environmental indicators like carbon emissions and energy intensity, linking them to organisational behaviour and financial outcomes. Clarkson, Overell, and Chapple (2011) focus on corporate environmental performance (CEP) as it relates to environmental disclosure, using proxies like emissions reductions and environmental policy strength. Similarly, Trumpp and Guenther (2017) refer to corporate environmental performance in terms of quantifiable resource usage and pollution

indicators, while Schaltegger (2002) and Sudha (2020) frame environmental performance through the lens of eco-efficiency, emphasising the ratio of environmental impact to economic value created.

Corporate Environmental Sustainability Performance (CESP) refers to the outcome of the efforts to minimise the ecological footprint through various measures. The main components of CESP include reduction in greenhouse gas emissions, lowered energy consumption, use of renewable energy, waste management, and water management. Emissions intensity measures the amount of greenhouse gases emitted per unit of revenue or production. The reduction in emissions intensity reflects the company's commitment to reducing its carbon footprint. Energy intensity measures the energy consumed relative to production and shows progress towards energy efficiency and renewable energy sources. Water intensity measures the volume of water used per production unit or revenue as a result of the company's practices towards water conservation and recycling.

1.4. Financial Performance

Sustained Financial Performance (SFP) refers to a company's ability to deliver consistent and robust financial outcomes over time, reflecting long-term profitability, operational efficiency, and market confidence. The concept has been framed in both academic and applied contexts. For example, McKinsey Global Institute (2022) defines sustained financial performance as a firm's ability to remain in the top quintile of economic profitability. In academic literature, SFP is typically assessed through a set of well-established financial indicators. These include Return on Equity (ROE) and Return on Assets (ROA), which reflect a company's efficiency in generating profit from equity and assets

(Fama & French, 1992; Brealey, Myers, & Allen, 2008); Price-to-Book (P/B) ratio and Tobin's Q, which offer insights into market valuation and expectations of future performance (Damodaran, 2012; Tobin, 1969); and revenue growth, a forward-looking measure of a firm's ability to scale sustainably (Hall & Lerner, 2010). Together, these indicators provide a robust, multidimensional view of a firm's financial endurance, forming the foundation for the SFP framework used in this study.

1.5. Relationship between environmental and financial performance

Many researchers have studied the relationship between corporate environmental sustainability performance and financial performance. Some studies indicate a positive correlation, indicating that sustainable practices can lead to cost savings, improved efficiency, and enhanced corporate reputation. (Alshehhi et al., 2018) (Ameer & Othman, 2012). Other studies highlight that the investment required for sustainable technologies and practices can add to the costs and negatively impact the business's profitability.

The Indian corporate sector recognises the importance of environmental sustainability, regulatory pressures, and global sustainability trends. Indian companies face challenges, such as stringent environmental regulations, disclosure requirements, high energy costs, water scarcity, natural resource shortage, and social inequity. The Companies Act 2013 introduced the Companies (CSR Policy) Rules, 2014, which were notified on February 27, 2014, specifying a mandatory requirement. Indian Companies above a specific financial threshold are required to spend a minimum of 2 per cent of their annual

net profits on Corporate Social Responsibility (CSR) initiatives. These include a range of activities about community welfare and environmental protection.

The Securities and Exchange Board of India (SEBI) has mandated the top listed companies to disclose their Business Responsibility Reports (BRR) and ensure transparency in sustainability practices (SEBI, 2012).

BRR was replaced in 2016 with the BRSR (Business Responsibility and Sustainability Report) by the Securities and Exchange Board of India (SEBI) for the top listed companies in India. BRSR emphasises the reporting of sustainability practices across ESG pillars, encouraging businesses to adopt responsible strategies for long-term sustainable growth. Companies must provide detailed disclosures on their sustainability performance, including policies, practices, risks, and outcomes related to environmental impact, employee well-being, social initiatives, governance, and ethical standards. As per SEBI guidelines, BRSR reporting is mandatory for the top one thousand listed companies by market capitalisation. It is also recommended that smaller companies follow the reporting standards.

1.6. Research Problem

There is an increasing focus on corporate sustainability, with a growing body of research examining the relationship between sustainability performance and financial performance.

Global studies have shown mixed results on the relationship between corporate sustainability performance and financial performance. There is a need for region-specific research to understand the linkage within different economic contexts.

The sustainability requirements may vary across different sectors. For example, Metals and cement companies face different challenges compared to those in the construction, retail, or pharmaceutical industries.

Research examining sustained financial performance shown by indicators, which include accounting measures of profitability, such as Return on Equity (ROE) and Return On Assets (ROA), market-based measures such as Price-to-book ratio (PB) and Tobin's Q (TQ), and Revenue growth, is important to understand the benefits of environmental performance outcomes.

The top-listed companies in India have already reached a particular stage of maturity in implementing and communicating the mission, strategy, policy, standards, and process formulation, as well as the specific initiatives they undertake, specific to CSR and ESG reporting. Most companies have established sustainability departments and compliance reporting mechanisms and adhere to global and Indian frameworks such as GRI, SDG, integrated reporting (IIRC), and BRSR. Many Indian companies are also a part of the Science-Based Targets (SBT), which use scientific research-based emissions reduction benchmarks aligned with the Paris Agreement's goals.

Research on corporate environmental performance and sustained financial performance in India is limited. Insights into the long-term outcomes reported by the companies on environmental impacts, such as emissions reduction, energy and water management, and linkage with financial performance, are yet to be available to draw actionable insights into the impact and success of these initiatives.

Many research studies studying the relationship between sustainability performance and financial performance reflect the companies' intentions, targets, or sustainability efforts represented by measures such as broad ESG scores, sustainability disclosures, sustainability policies, corporate governance, or CSR (Corporate Social Responsibility) measures.

Understanding this relationship would help the Indian firms align their business strategies with sustainable practices. This can drive long-term financial success and contribute to broader environmental goals. Indian companies operate in a unique regulatory and economic environment, influencing their sustainability practices and financial outcomes. As per SEBI, there is a paucity of empirical data linking these practices to financial performance in the Indian context (SEBI, 2012).

1.7. Research Objectives

There is a need to empirically and qualitatively analyse how the companies achieve specific environmental sustainability outcomes as reported on the metrics in their annual reports, integrated reports, and sustainability reports. This research examines the performance based on the environmental improvement metrics reported by the companies over five years. The research aims to provide insights into the rationale for the 30 large non-financial and non-service NSE 50 Indian companies to effectively integrate environmental sustainability into their business strategies to achieve sustained financial performance.

This research studies the environmental impact outcomes from corporate sustainability efforts, such as reduction in emissions intensity, energy intensity, and water intensity, as measures of Corporate Environmental Sustainability

Performance and their effects on financial metrics, such as ROE, ROA, Price-to-book ratio, Revenue, and Tobin's Q over five years.

1.8. Research Questions

The research questions for this study are as follows:

- What is the relationship between CESP and SFP in the selected companies? How do measures of CESP, such as emissions intensity, energy intensity, and water intensity, correlate with financial metrics like Return on Equity (ROE), Return on Assets (ROA), Price-to-book ratio, Revenue growth, and Tobin's Q over five years?
- Are there significant variations in the CESP-SFP relationship across different sectors? How do different industries within the selected companies manage environmental sustainability and achieve financial performance?
- Which companies are the top performers regarding sustainability and financial metrics, and what best practices do they exhibit?
- How can these findings inform strategic and policy recommendations for companies aiming to improve their sustainability practices and financial outcomes?

1.9. Hypotheses

The following hypotheses have been formulated based on the research questions:

H1: Overall CESP–SFP Relationship

There is a positive association between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) among selected NSE-listed companies.

H2: Groupwise Difference in Financial Performance

Companies in the high CESP group show significantly higher financial performance compared to those in the low CESP group.

H3: CESP Predicts Financial Performance Across Sectors

Corporate Environmental Sustainability Performance (CESP) is a significant predictor of a firm's financial performance, and the predictive strength varies by the environmental impact sector.

1.10. Significance of the Study

The study on the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) holds theoretical, practical, and policy implications. This study contributes to the academic literature by offering practical insights for companies and policymakers. It provides a nuanced understanding of how various aspects of corporate environmental sustainability outcomes influence the financial outcomes of the business.

The research addresses gaps in the existing literature by focusing on a developing economy where regulatory, economic, and operational contexts differ from those in developed countries. It highlights region-specific aspects and adds to the global knowledge of environmental sustainability outcomes and financial performance.

The research studies the sector-specific variations in environmental sustainability and financial performance. These insights can guide corporate managers in making informed decisions about integrating environmental sustainability practices into their business strategies.

The study's findings can inform policymakers and regulators about the effectiveness of sustainability regulations and highlight areas where additional incentives or restrictions may be needed. The study can offer insights that help align corporate practices with national sustainability commitments, such as the Sustainable Development Goals (SDGs).

2. Literature Review

There has been wide and varied research on the relationship between corporate sustainability and financial performance in the past decade. These research studies have used different methodologies and measurement variables. Although many researchers have shown a positive correlation between the variables, some studies have also highlighted contrasting results.

2.1. Corporate Sustainability

Corporate sustainability emphasises that businesses can contribute to sustainable development goals by running their operation without affecting the ability of future generations to meet their needs. The research studies have indicated that corporate sustainability involves focusing on environmental, social, and economic standards together (Montiel, 2005).

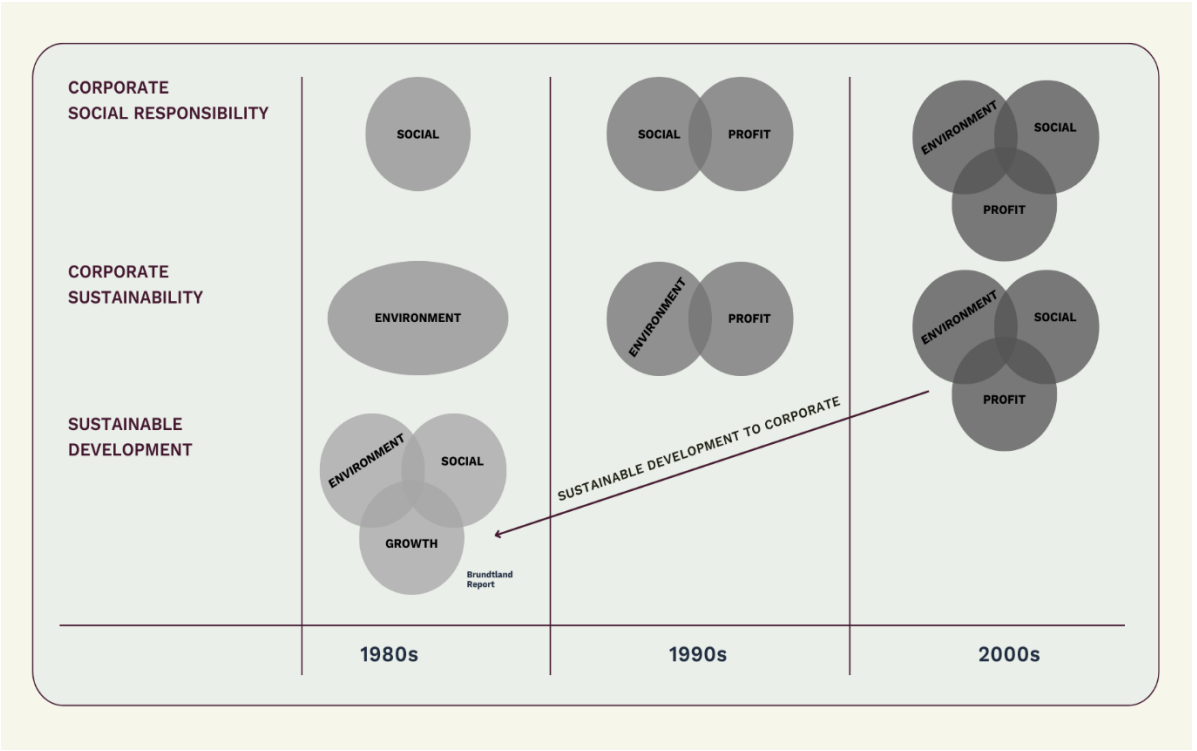
The researchers Dylick & Hockets argued that if the fundamental principles of sustainable development are applied at the company level, corporate sustainability can be defined as "meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities, etc.), without compromising its ability to meet the needs of future stakeholders as well." (Dyllick & Hockerts, 2002). Economically sustainable companies have a stable cash flow and liquidity position and deliver above-average returns to shareholders. Ecologically sustainable companies utilise natural resources at a rate lower than substitutes' natural reproduction or development. They do not generate emissions faster than the natural system's capacity to absorb and assimilate them. They also do not engage in activities that degrade ecosystem services. Socially sustainable companies contribute to the

communities where they operate by enhancing the human capital of individual partners and the social capital of these communities. They manage social capital transparently, ensuring stakeholders understand the company's motivations and generally agree with its value system (Dyllick & Hockerts, 2002).

Corporate sustainability and corporate social responsibility (CSR) have become very prominent over the last two decades, as noted by Alan Gutterman (2022). CSR involves a company's actions to promote social good beyond its immediate interests, which may be required by law (Gutterman, 2022). CSR is regarded as voluntary, whereas corporate sustainability is an organisational practice integrated into business strategy (Gutterman, 2022). CSR spending has become a mandatory requirement according to the Companies Act 2013 in India, where a certain percentage of a company's profits must be earmarked towards social objectives.

Figure 2.1 shows the evolution of the main concepts of corporate sustainability and CSR (Pazienza et al., 2022)

Figure 2.1. Evolution of Corporate Sustainability



2.2. Corporate Environmental Sustainability Performance (CESP)

Corporate Environmental Sustainability Performance (CESP) has become important to corporate strategy and performance. CESP shows a company's commitment to managing its environmental impact through sustainable practices and ensuring long-term business viability.

The key indicators of CESP include the following:

- Greenhouse Gas Emissions: One of the most important indicators, greenhouse gas (GHG) emissions measurement, involves quantifying the total emissions produced by a company. This includes direct emissions from owned or controlled sources and indirect emissions from the consumption of purchased electricity, steam, or other energy sources (Scope 1 and Scope 2 emissions) (Brammer & Pavelin, 2006); (Clarkson et al., 2011).

- Energy Consumption: This metric includes total energy consumed from renewable and non-renewable sources, energy intensity (energy used per unit of production or revenue), and efforts to improve energy efficiency (Gleick, 2011)
- Water Usage: Water usage measures water withdrawal, water sources affected, and water recycling and reuse. (Schaltegger & Wagner, 2006)
- Waste Generation: This includes waste management practices, such as waste reduction, recycling, and disposal (Schaltegger & Wagner, 2006)
- Sustainability Initiatives: Sustainability initiatives include policies and processes to reduce environmental impact and promote social welfare, such as biodiversity conservation, emissions reduction targets, and community engagement programs (Clarkson et al., 2011)
- Carbon Footprint and Emissions Intensity: This measures a company's total greenhouse gas emissions and the emissions per unit of revenue or production. Companies that reduce their emissions intensity show improved environmental performance and operational efficiency. (Lyon & Maxwell, 2006)
- Environmental indicators: These indicators may encompass greenhouse gas emissions, energy consumption, water usage, waste generation and management, air and water pollution, biodiversity conservation, and resource efficiency. (C. Meiden1and A. Silaban, 2023).

Measuring CESP ensures transparent reporting on CESP metrics. This helps build trust with stakeholders, including investors, customers, and the community. This shows the business’s commitment to sustainable and responsible business practices. Regulatory requirements and investor expectations also demand

sustainability disclosures. CESP measurement is an important aspect of corporate strategy and risk management. (Clarkson et al., 2011)

Trump & Guenther have used carbon dioxide emissions to measure emission intensity for environmental performance (Trumpp & Guenther, 2017). Waste, water, and energy efficiency have also been widely used. (Sudha, 2020)

Sustainability performance encompasses three key concepts: (1) the purpose and principles of the organisation's activities, (2) the policies and procedures to achieve the organisational goals, and (3) the outcomes or results. The distinctions between these concepts have significant implications for measuring corporate sustainability performance. (Grewal & Serafeim, 2020).

The reporting and measurement of CESP is influenced by many sustainability standards and frameworks that have evolved during the last decade.

Sustainability Standards and Frameworks

The standards that have been widely accepted as guidelines and benchmarks to assess and report on sustainability performance are as follows:

- Global Reporting Initiative (GRI): This is a widely accepted global standard that provides detailed reporting criteria on social, environmental, and economic implications. GRI Standards have evolved rapidly in recent years and help companies benchmark their sustainability efforts and report them to various stakeholders
- Sustainability Accounting Standards Board (SASB)**:** SASB standards help companies disclose information on financial material sustainability to investors. SASB standards are industry-specific and deal with

sustainability issues most likely to impact economic performance. (SASB, 2018).

- International Sustainability Standards Board (ISSB): ISSB was developed in 2022, and IFRS (International Financial Reporting Standards) Sustainability Disclosure Standards provide a global format for sustainability and climate reporting.
- Business Responsibility and Sustainability Report (BRSR)**:** The BRSR is an Indian framework that combines the Global Reporting Initiative (GRI) and the United Nations Sustainable Development Goals (SDGs). BRSR focuses on responsible business conduct and sustainability, including disclosure of the environmental, social, and governance (ESG) aspects. The components of BRSR include reporting on the company's policies, practices, and performance in environmental management, employee welfare, community development, and governance structures (SEBI, 2021).
- Sustainable Development Goals (SDGs): This is a set of 17 global goals included in adopted by all United Nations members in 2015; "SDGs provide a shared blueprint for peace and prosperity for people and the planet, now and into the future. They recognise that ending poverty and inequities must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth, without negatively impacting the climate, natural resources, and biodiversity". (SDGs, 2015)

- United Nations Global Compact (UNGC): The UNGC is a voluntary initiative that assists companies in implementing sustainability principles and supporting the UN Sustainable Development Goals (SDGs).
- Other well-known sustainability standards and frameworks include the Carbon Disclosure Project (CDP), Dow Jones Sustainability Index (DJSI), and Integrated Reporting Framework (IIRC).

The top-listed Indian companies prepare integrated financial reports, including the BRSR requirements for sustainability reporting. Many companies also integrate sustainability disclosures using the GRI, IIRC, and SDG frameworks. It is important to look at the drivers of CESP to understand the motivation for corporates to align their business activities with sustainable practices.

Drivers of CESP

Many internal and external factors influence CESP, such as pressure from the market and consumers. Growing customer awareness and demand for sustainable products are influencing businesses to embrace environmentally friendly practices. Lyon and Maxwell (2011) discuss how consumer pressure can lead to more transparent environmental disclosures and improved sustainability practices.

The authors (Eccles et al., 2014) highlighted in their research that companies with strong sustainability performance attract more investment as they are considered more resilient and forward-thinking. This is based on the understanding that sustainable businesses are better positioned to handle risks and seize opportunities relating to environmental and social challenges.

There are mandatory regulations from governments and other regulatory bodies, such as emissions, waste management, resource usage, and social responsibility. The common goal of these regulations is to minimise negative environmental and social impacts. Compliance with these regulations helps companies avoid legal costs and enhances their reputation as responsible corporate citizens. (Brammer, S., & Pavelin, S. (2006))

Sustainability initiatives can result in cost savings through improved efficiency and resource management. Schaltegger and Wagner (2006) emphasised that sustainability performance is closely associated with business competitiveness and economic performance. Companies that excel in environmental sustainability can differentiate themselves in the market, leading to improved brand reputation and customer loyalty. (M. Porter & Kramer, 2007). Embracing sustainable practices can provide companies with a competitive advantage. Companies that integrate environmental and social aspects into their business strategies can differentiate themselves from competitors, attract environmentally conscious customers, and enter new markets.

Innovations in technology are enablers of CESP and can help companies reduce their environmental footprint, enhance resource efficiency, and improve social outcomes. For example, advancements in renewable energy, waste management technologies, and sustainable production processes can help drive a company's environmental performance. The author, Gleiek, and others discuss how technological innovation is important for addressing environmental challenges and achieving sustainability goals. (Gleick, 2011)

2.3. Sustained Financial Performance (SFP)

Sustained Financial Performance refers to a company's ability to maintain consistent financial success over time. SFP refers to consistently achieving financial goals over an extended period, reflecting a company's ability to generate long-term value while maintaining stability and growth.

Drivers of SFP

Corporate Governance structures are important for ensuring accountability and strategic decision-making, contributing to SFP. (Shleifer & Vishny, 1996). Continuous research and development (R&D) investment drives innovation, leading to sustained competitive advantage and financial performance. (Hall & Lerner, 2010). Efficient operations and cost management are fundamental for maintaining profitability and SFP(Aaker, 1992; Porter, 1985). Strong brand equity and market position can lead to customer loyalty and sustained revenue streams (Aaker, 1992; Keller, 1993). Sound financial management practices, including prudent risk management and capital allocation, are important for long-term financial health. (*Fama, Eugene F, & French, Kenneth R, 1992*)

Measuring SFP

Accounting-based and market-based measures have been used extensively, with studies like Trumpp & Gunther (2017) employing both. Accounting-based metrics reflect company profitability and operational efficiency, whereas market-based metrics consider external factors such as stakeholder involvement. (Orlitzky et al., 2003).

Accounting-based metrics are commonly used in research studies as measures of financial performance. (Brealey et al., 2020). Accounting-based metrics

consider the revenues, costs, and profits. Some studies adjust profits relative to a firm's size, such as assets. Standard profitability measures include return on sales (ROS), return on equity (ROE), return on assets (ROA), and return on investment (ROI) (Przychodzen & Przychodzen, 2015; Russo & FOUTS, 1997). ROE, ROA, and profit margin are widely used because they reflect a firm's ability to use its assets effectively (Manrique & Martí-Ballester, 2017). Return on Assets (ROA) is measured as net income divided by total assets. A Higher ROA indicates better asset utilisation and profitability. (Brigham, E. F., & Ehrhardt, M. C., 2013)

Market-based metrics, such as Tobin's Q, are used in many studies to assess companies' performance. Market-based metrics are based on a company's stock price. (Filbeck & Gorman, 2004), While others calculate stock returns using panel data (e.g., Hamilton, 1995). Market value is used in some studies (e.g., Konar & Cohen, 2001). Tobin's Q uses the market value adjusted against the firm's replacement costs. (e.g., Dowell et al., 1999). Regarding market-based measures, Tobin's Q and stock return are commonly used. Tobin's Q offers insights into the market's valuation of a firm's assets compared to their book value, indicating higher market expectations if above one (King & Lenox, 2001).

The commonly used measures of financial performance are as follows:

- Return on Equity (ROE): ROE is measured as the Net income divided by shareholders' investment. ROE is an important indicator of financial performance and shareholder value creation. (Higgins, R. C. (2012).
- Earnings Before Interest, Taxes, Depreciation, and Amortisation (EBITDA): This measure is used to analyse and compare profitability between

companies and industries before considering the effects of financing and accounting decisions. (Damodaran, A. (2012).)

- Net Profit Margin: This metric indicates the percentage of revenue that remains as profit after all expenses are deducted. A higher net profit margin signifies efficient cost management and solid financial health (Brigham, E. F., & Ehrhardt, M. C., 2013)
- Free Cash Flow (FCF): FCF represents the cash a company generates from operations after considering investments in fixed assets. It is an important measure of financial flexibility and the ability to pursue growth opportunities. (Higgins, R. C. (2012))
- Price-to-Book Ratio (P/B) is a market valuation metric that compares a company's market value to its book value (Berk & DeMarzo, 2016). A higher price-to-book ratio indicates that the market perceives the company as being able to generate more value from its assets than the book value. This reflects more robust performance or growth potential.
- Compound Annual Growth Rate (CAGR) of Revenue measures the mean annual growth rate of a company's revenue over a period longer than one year (Brealey et al., 2008). CAGR provides a smooth annual growth rate over a period, implying consistent incremental gains free from the year-to-year volatility in revenue figures.
- Tobin's Q is another metric used to assess market valuation. Tobin's is defined as the ratio of the market value of a company's assets to the replacement cost of those assets (Tobin, 1969). A Tobin's Q greater than 1 indicates that the market values the company's assets more than their replacement costs. This indicates good market performance and optimistic

investor expectations about future profitability. Tobin's Q, less than one, signals undervaluation relative to the asset replacement cost caused by underperformance or market pessimism.

2.4. Relationship Between CESP and SFP

Many research studies have shown that corporate sustainability has a positive impact on financial performance. The researchers Alshehhi & others performed a meta-analysis of 132 top-tier journal articles and found that 78% of the studies reported a positive relationship between corporate sustainability and financial performance. This positive correlation is attributed to enhanced corporate reputation, increased operational efficiency, and improved risk management practices (Alshehhi et al., 2018).

Theoretical Frameworks

The theoretical frameworks relating to environmental and financial performance are as follows:

- Stakeholder Theory: Stakeholder theory states that companies must manage their relationships with various stakeholders (e.g., customers, employees, suppliers, investors, and communities) to achieve long-term success. This theory indicates that companies that focus on the interests of multiple stakeholders improve their financial performance (Donaldson & Preston, 1995).
- Resource-Based View (RBV): The Resource-Based View indicates that a firm’s resources and capabilities contribute to gaining a competitive advantage and sustained financial performance. Resources that are valuable, rare, inimitable, and non-substitutable (VRIN) provide long-term benefits

(Barney et al., 2001). Environmental sustainability practices are valuable resources contributing to operational efficiencies, cost savings, and innovation, leading to improved financial performance.

- Institutional Theory: Institutional theory focuses on the influence of regulatory, normative, and cognitive pressures on organisational behaviour. Companies adopt certain practices to gain legitimacy and align with societal expectations (Scott, 2001). Adopting environmental sustainability practices can help companies comply with regulations, meet stakeholder expectations, and enhance their legitimacy, translating into better financial performance.
- Porter's Hypothesis: Porter's hypothesis argues that stringent environmental regulations can stimulate innovation and improve competitiveness, leading to better financial performance (M. E. Porter & Linde, 1995). Companies that proactively implement ecological sustainability practices benefit from innovation-driven efficiencies and competitive advantages, which can enhance their financial performance.

  From a stakeholder theory perspective, corporate sustainability efforts can reduce the likelihood of adverse regulatory action (Freeman, 1984; Hillman & Keim, 2001), attract loyal consumers, and improve access to finance. These efforts also create value by protecting and enhancing the corporate reputation. (Cochran & Wood, 1984) (Freeman et al., 2007).

Empirical Studies

Many studies indicate that good environmental performance leads to cost savings, improved efficiency, and enhanced corporate reputation, improving financial performance (Clarkson et al., 2011; Guenster et al., 2011). However, some studies argue that the high initial costs of implementing sustainable

practices may yield little financial benefit, particularly for smaller companies with limited resources (Wagner, 2005).

Other studies have pointed out that corporate sustainability efforts can positively impact a company by enhancing access to valuable resources. (Cochran & Wood, 1984) (Waddock & Graves, 1997), attracting and retaining higher-quality employees (Greening & Turban, 2000), and improving the marketing of products and services. (Hull & Rothenberg, 2008)

Environmentally compatible products, processes, and management systems enhance profitability through revenue gains or cost savings. Revenues increase because consumers prefer products of environmentally proactive companies (Rosewicz, 1990). Studies have linked environmental commitment with enhanced profitability, especially in high-growth industries (Russo & Fouts, 1997). Evidence indicates that proactive ecological management can increase a firm's market value (Klassen & McLaughlin, 1996), reputation, and financial performance (Miles & Cavin, 2000).

Investment in environmental management systems reduces wastage of raw materials, inefficient production processes, and crisis management costs. (Schmidheiny, 1992) Market values of firms tend to go up after the firm takes an environmentally proactive stance or after receiving environmental awards (Klassen & Mclaughlin, 1996). Other researchers (Orlitzky et al., 2003) conducted a meta-analysis. They found a positive relationship between corporate social performance (CSP) and financial performance (FP), indicating that companies with strong sustainability practices tend to perform better financially. The study highlights that sustainability efforts can improve profitability, reduce risk, and enhance reputation.

A study by Eccles et al. (2014) showed that high-sustainability companies significantly outperform their low-sustainability counterparts over the long term regarding stock market performance and accounting measures. Other studies have shown that reducing emissions and energy consumption can lower operational costs and mitigate risks associated with regulatory compliance and environmental liabilities. (Hart & Milstein, 2003).

Competitive advantage depends on aligning internal capabilities with evolving external conditions (Hart, 1995). Research indicates that investments in material sustainability issues can enhance shareholder value, while investments in less important areas tend to have a neutral impact. (Khan et al., 2015).

Trump and Guenther (2017) investigated the relationship between corporate environmental performance (CEP) and corporate financial performance (CFP) across companies listed in the CDP Global 500, S&P 500, and FTSE 350 indices. Their findings highlighted that businesses with CEP reflect a negative association between CEP and CFP, and those with higher CEP reflect a positive connection (Trumpp & Guenther, 2017). The low CEP businesses adopt a reactive strategy towards environmental initiatives, leading to additional costs and changes that reduce efficiency and profitability. Businesses that follow a proactive environmental strategy in developing resources and capabilities can achieve a competitive advantage, resulting in superior CEP and CFP (Trump & Guenther, 2017)

Some studies that have highlighted challenges and mixed results are given below:

- (Wagner, 2005): Highlighted that the financial benefits of sustainability practices may be realised after a lapse of time and vary based on industry and company size. High initial costs and long payback periods can be barriers for smaller firms.
- (Busch & Friede, 2018): Their review highlighted mixed results, with some firms experiencing positive financial benefits from sustainability practices and others not seeing significant benefits.
- (Kim & Li, 2021): They explored the effects of environmental, social, and governance (ESG) factors on corporate financial performance. Their study indicates that ESG factors enhance profitability and credit ratings, with corporate governance having the most significant positive impact. However, they found that the environmental score sometimes negatively affects credit ratings.
- (Patten, 2002): The researchers investigated the link between environmental performance and disclosure, finding mixed results depending on the environmental metrics used.
- (Jha & Rangarajan, 2020): The study investigates the causal relationship between corporate sustainability performance and corporate financial performance among the top 500 Indian firms over a decade from 2008 to 2018. The study evaluates various dimensions of corporate sustainability performance, including environmental, social, and governance (ESG) factors, and their effects on accounting-based and market-based financial performance metrics. The findings indicate a negative correlation between environmental performance and financial performance, emphasising that higher sustainability performance does not ensure better financial outcomes.

The relationship's strength and direction vary across different sustainability dimensions and industry sectors.

Industry-Specific Studies:

Research indicates that the impact of sustainability practices varies across regions and industries. The author (Schaltegger, 2002) finds that environmental management leads to economic success in specific contexts, indicating that industry-specific factors influence the sustainability-performance relationship. Clarkson et al. (2011) investigated the relationship between environmental and financial performance in the U.S. manufacturing sector. The study found that companies with superior environmental performance (e.g., lower emissions) had higher profitability and market value.

King and Lenox (2001) examined the impact of pollution prevention practices on financial performance in the manufacturing industry. The results indicated that firms adopting proactive environmental strategies experienced better financial outcomes, including higher returns on assets and market valuation.

Companies in sectors such as technology and pharmaceuticals also benefit from sustainability practices, primarily through enhanced reputation and investor confidence (Eccles et al., 2014). The authors Hart & Ahuja (Hart & Ahuja, 1996) have shown that reductions in emissions and waste can lead to substantial cost savings and improved financial performance in the manufacturing sector. Other researchers (Larrinaga et al., 2008) have shown that mining companies with strong sustainability practices reported better financial outcomes, primarily due to reduced environmental liabilities and enhanced community relations.

Studies have highlighted that sustainable mining practices contribute to long-term financial stability by ensuring compliance with environmental regulations and enhancing corporate reputation (Jenkins & Yakovleva, 2006). Companies focused on sustainability reflect higher returns on capital, primarily through improvements in natural resource management. (Bonini et al., 2009). Pharmaceutical companies with environmental sustainability programs reported better corporate reputation, operational efficiencies, and financial performance. (Ramanathan, 2014).

Porter and Kramer (2006) highlighted that companies with integrated sustainability strategies show operational savings and improved customer loyalty. Sustainable practices in retail lead to better financial performance through enhanced brand reputation and operational efficiencies. (Glavas, 2012).

A study by Ameer and Othman (2011) found that the top 100 global sustainable companies in 2008 experienced significantly higher growth in sales, return on assets, profit before tax, and cash flow from operations in specific sectors compared to non-sustainable counterparts during 2006-2010. This superior financial performance among sustainable companies increased over the study period (Ameer & Othman, 2012).

Research gaps

While studying the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP), several research gaps still need to be addressed. These gaps highlight areas where further investigation is required to provide more comprehensive insights.

- Limited research exists on the relationship between CESP and financial performance in emerging markets. Alshehhi et al. (2018) identified the need for more studies from developing countries to bridge the knowledge gap. Studies focusing on developing economies can provide valuable insights into region-specific dynamics (Al-Shammari, 2015; Ali et al., 2017).
- Long-term studies are needed to understand the sustained impact of environmental sustainability practices on financial performance (Orlitzky et al., 2003).
- Limited research has been conducted in emerging markets and developing economies. Most studies focus on developed economies, leaving a gap in understanding how these dynamics play out in different regulatory, economic, and cultural contexts (Ali et al., 2017; Eccles et al., 2014)
- Most existing research examines the relationship between CESP and SFP over relatively short time frames. There is a lack of longitudinal studies that explore the long-term impacts of sustainability practices on financial performance (Orlitzky et al., 2003; Wagner, 2005).
- While some research has addressed sector-specific differences, there is still a need for more granular analysis within specific industries. Understanding each sector's unique characteristics and sustainability challenges can provide more targeted insights (King & Lenox, 2001).

Conclusion

The literature on Corporate Environmental Sustainability Performance (CESP) highlights the importance of sustainable practices for both environmental and financial outcomes.

Sector-specific studies highlight the varying impact of CESP on SFP across different industries. Energy-intensive sectors like manufacturing and mining show substantial financial benefits from sustainability practices due to cost savings and regulatory compliance. Non-energy-intensive sectors, like technology and pharmaceuticals, benefit through enhanced brand reputation and investor confidence—service sectors, including banking and retail, gain from improved risk management and customer loyalty.

Addressing the research gaps will help in a nuanced understanding of the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP). These efforts will contribute to developing more effective strategies and policies for integrating sustainability into corporate practices and enhancing financial performance.

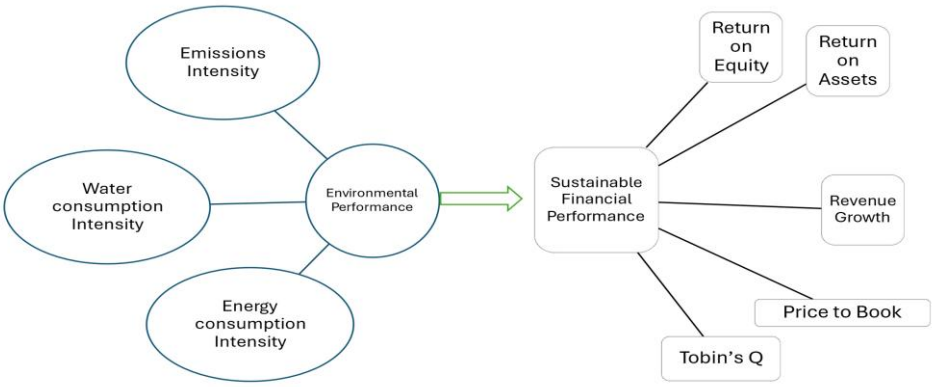
3. Research Methodology

3.1. Research Design

This study follows a quantitative, correlational, comparative and qualitative research design to examine the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) among NSE-listed companies. The goal is to assess whether stronger environmental performance aligns with better financial outcomes and whether these relationships differ across sectors.

Figure 3.1 shows the components of the linkage between CESP and SFP:

Figure 3.1. CESP SFP components



3.2. Research Objectives

Primary Objective:

The primary objective of this study is to explore the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) in selected companies. The study looks at the

correlation between the CESP metrics (emissions intensity, energy intensity, water intensity) and the SFP metrics (ROE, ROA, Price-to-book ratio, CAGR of revenue, Tobin's Q) over five years.

Secondary Objectives:

- Analyse Sector-Specific Variations in CESP-SFP Relationship: Identify how different sectors within the selected companies manage environmental sustainability and achieve financial performance.
- Compare high-environmental-impact sectors (e.g., Metals, Cement) with low-environmental-impact sectors (e.g., FMCG, Auto).
- Rank Companies Based on CESP and SFP: Develop a percentile ranking system to compare companies' environmental sustainability and financial performance.
- To identify the best practices in environmental sustainability from companies that are leaders in their sectors and analyse the impact of specific environmental practices on financial performance.

3.3. Sample Selection

The sample consists of the large-cap 30 non-financial and non-service companies from those listed on the NSE 50 index (*https://www.nseindia.com*). This study covers the period of five financial years, from 2018-19 to 2022-23.

The criteria for inclusion of companies in the sample are given below:

- Companies with available data on greenhouse gas (GHG) emissions, energy consumption, and water usage for the five years.
- Companies with detailed financial performance metrics available for the same period.

Table 3.1 shows the list of selected companies, including their sectoral category and NSE symbol.

Sample characteristics

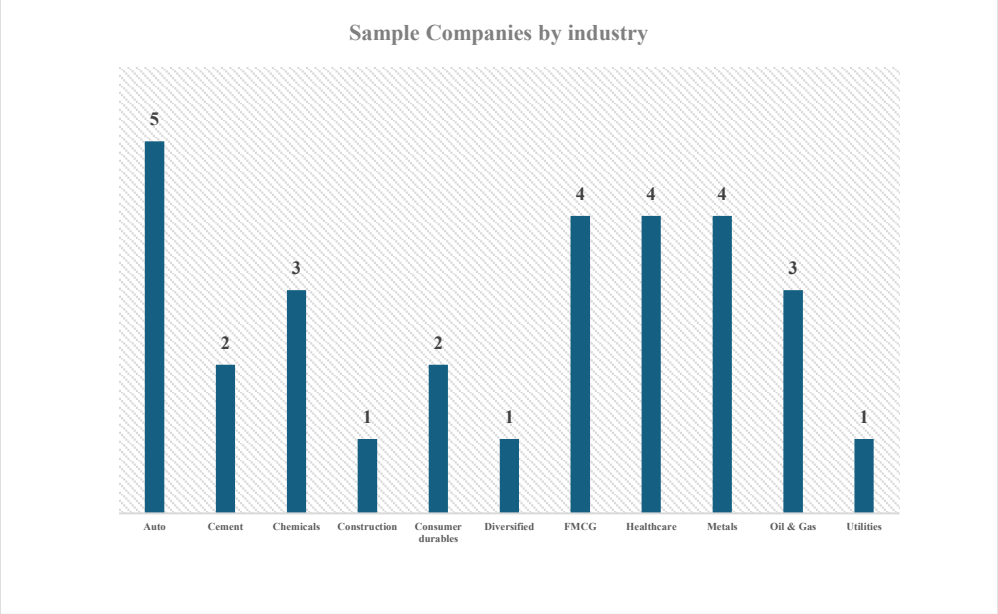
The selection of the companies was done from the NSE 50 index for empirical research on the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP). The sample encompasses diverse sectors, providing a comprehensive view of the Indian market. The companies represented are classified into high environmental impact (e.g. Metals, Oil & Gas) and low environmental impact (e.g., FMCG, pharma).

The characteristics of the selected sample companies are given below:

Sectoral Representation:

Figure 3.2 shows the sectoral representation of the selected sample companies.

Figure 3.2. Sectoral Representation



- Metals (4 companies)

- Cement (2 companies)
- Oil & Gas (3 companies)
- Chemicals (3 companies)
- Utilities (1 company)
- Consumer Durables (2 companies)
- Construction (1 company)
- FMCG (4 companies)
- Auto (5 companies)
- Healthcare (4 companies)
- Diversified (1company_

The diversified, construction, consumer durables, and utilities sectors are combined under the “Others” category.

High Market Capitalisation:

The selected companies are sampled among the largest in India by market capitalisation, ensuring they include financially significant and economically influential firms. This ensures that the results reflect the broader economic trends and corporate practices within substantial sectors of the Indian economy. (https://www.nseindia.com/products-services/indices-nifty50-index)

Operational Stability:

Large-cap companies tend to have more stable operations, which is important for isolating the effects of sustainability practices on financial performance. They also have better resources and infrastructure to implement and report on sustainability initiatives.

Sectoral Analysis

- *Metals, Cement, Oil and gas, and Chemicals:*

These sectors are included due to their high environmental impact, which makes them important for analysing sustainability practices and their impact on financial performance. These sectors are heavily regulated and face significant scrutiny regarding their environmental practices.

- *FMCG, Consumer Durables, Construction, Auto, Healthcare, and Utilities:*

While these sectors are not as environmentally intensive as metals or oil and gas, they also have environmental impacts. This ensures a balanced view and allows for cross-sector comparisons.

Diversity in Sustainability Practices

Companies in sectors like FMCG and Healthcare may focus more on sustainable sourcing and resource management. In contrast, those in Oil and gas or Metals may concentrate more on emissions reduction and energy efficiency. This diversity helps us understand the different approaches to sustainability and their varied impacts on financial performance.

Reporting and Disclosure:

Larger companies have more transparent sustainability reporting mechanisms. This ensures the availability of comprehensive data necessary for empirical research.

Stakeholder Interest

The selected companies are prominent and attract significant attention from investors, analysts, and other stakeholders. Their sustainability and financial performance are closely monitored, providing rich data for analysis.

Influence on Policy and Standards:

These companies set industry benchmarks and influence regulatory and policy decisions, making their practices important for empirical analysis.

Remarks on Sample Selection

The selection of the non-financial and non-service NSE 50 companies is appropriate for studying the relationship between CESP and SFP. The diverse sample covers various sectors and includes companies with a significant economic impact. This ensures that the findings are robust and reliable and reflect broader corporate practices and financial performance trends within the Indian market.

This selection facilitates a comprehensive analysis of the sustainability practices across different sectors and ensures the generalisability of the results to other large companies in emerging markets.

3.4. Quantitative Data

Corporate Environmental Sustainability Performance (CESP)

Due to the non-availability of complete 5 years of quantitative data on Renewable energy usage and waste management for the selected companies, CESP is measured using three dimensions, mainly composed of the intensity of the GHG Emissions, Energy consumption, and Water usage. CESP helps assess

the efficiency of a company's operations in terms of environmental impact relative to its economic output.

GHG Emissions Intensity (GI)

GHG emissions are classified as Scope 1, 2, and 3 per the Greenhouse Gas (GHG) Protocol (GHG protocol), which sets the standards for businesses to measure their greenhouse gas emissions. GHG Emissions from direct use of fuels and emissions released during industrial processes, such as chemical reactions, are classified as Scope 1 emissions. The indirect GHG emissions from energy purchased from third parties are classified as Scope 2 emissions. The other emissions are indirect GHG emissions caused by upstream or downstream processes in the business's value chain. Scope 1 and 2 Emissions are more accessible to measure and manage because they are within the business's direct control. For this research, GHG emissions include only Scope 1 and Scope 2 emissions since Scope 3 Emissions are more complex to measure because they are not directly within the company's control and involve third parties in the value chain.

GHG Emissions Intensity (GI) is a metric that measures a company's efficiency in terms of greenhouse gas (GHG) emissions relative to its revenue generation. The formula for the calculation of GHG Intensity is given below:

Equation 3.1.

$$GI_n = \frac{GE_n}{Rev_n}$$

Where:
GI_n = Greenhouse Gas Emissions Intensity for the year n
GE_n = Annual greenhouse gas emissions in tonnes of CO_2 equivalents (TCO2) for the year n
Rev_n = Annual revenue in million rupees for the year n

Annual Greenhouse Gas Emissions (GE) is the total amount of greenhouse gases the company emits yearly, measured in tonnes of CO2 equivalents ($TC0_2$). It includes the Scope 1 and Scope 2 sources of GHG emissions. A lower GHG Intensity indicates better environmental performance, implying the company emits fewer GHGs per revenue unit.

Energy Consumption Intensity (EI)

Energy Consumption Intensity (EI) is a metric that measures the amount of energy a company consumes relative to the revenue it generates. It indicates how much energy a company uses to produce a revenue unit.

The formula for the calculation of Energy Consumption Intensity (EI) is given below:

Equation 3.2.

$$EI_n = \frac{EC_n}{Rev_n}$$

Where:
EI_n = Energy consumption Intensity for the year n
EC_n = Annual Energy consumption in Gigajoules (GJ) for the year n
Rev_n = Annual revenue in million rupees for the year n

Annual Energy Consumption (EC) is the total energy the company consumes yearly, measured in gigajoules (GJ). It includes all energy used in the company's operations, such as electricity, natural gas, and fuel. A lower EI indicates that the company uses less energy to generate a unit of revenue. Energy costs are a significant part of operational expenses.

Water Consumption Intensity (WI)

Water Consumption Intensity (WI) measures a company's water consumption relative to its revenue. It indicates how much water a company uses to produce a revenue unit.

The formula for the calculation of Water Consumption Intensity (EI) is given below:

Equation 3.3.

$$WI_n = \frac{WC_n}{Rev_n}$$

Where:
WI_n = Water consumption Intensity for the year n
WC_n = Annual water consumption in kilolitres (KL) for the year n
Rev_n = Annual revenue in million rupees for the year n

Annual Water Consumption (WC) is the total water the company consumes yearly, measured in kilolitres (kl). It includes all forms of water used in the company's operations, such as water for manufacturing processes, cooling, sanitation, and other uses. A lower WI indicates higher operational efficiency, as it means the company uses less water to generate a unit of revenue.

Sustained Financial Performance (SFP):

Accounting-based and market-based performance measures are two approaches for measuring the financial performance of a business. Accounting-based and market-based measures complement each other, and research indicates that combining both offers a more holistic view of firm performance. Sustained Financial Performance integrates both approaches with revenue growth, thereby gaining a nuanced understanding of firm value, growth and profitability.

Accounting-based measures

Accounting-based measures are based on historical financial data or the financial statements of a business. These metrics capture the firm's profitability, efficiency, and financial health. These measures are based on audited financial statements, which makes them reliable and easily comparable across periods. However, they can be backwards-looking and depend upon the accounting practices, such as earnings management. They do not consider the prospects and the value of the business's intangible assets.

Return on Equity (ROE):

Return on Equity (ROE) measures a company's profitability by showing its profit as compared to the money invested by the owners. It is calculated as Net Income divided by Shareholders' Equity.

Return on Assets (ROA):

Return on Assets (ROA) indicates a company's profitability in terms of its total assets. It is measured as the ratio of Net Income to Total Assets.

Revenue:

Revenue is the total income from selling goods or services related to the company's primary operations.

Market-based measures

Market-based measures are forward-looking indicators that reflect investor expectations and the market's valuation of a firm. These measures integrate information about the firm's future performance and growth potential. Market measures can be influenced by external factors (e.g., market sentiment,

macroeconomic conditions), which can lead to volatility and noise that do not reflect the firm's intrinsic performance.

Price-to-Book Ratio:

The Price-to-Book (P/B) ratio compares a company's market value to its book value. It is calculated as Market Price per Share divided by Book Value per Share.

Tobin's Q:

Tobin's Q compares the market value of a company's assets to the replacement cost of those assets. It is calculated as the Market Value of Assets divided by the Replacement Cost of Assets.

3.5. Variables and Measures

Compound Annual Growth Rate (CAGR)

The Compound Annual Growth Rate (CAGR) is an important metric for analysing the annual growth rate over a specific period. It provides a smooth year-on-year growth rate that shows the consistent rate at which the value would have grown if it had grown at the same yearly rate.

CAGR is helpful for long-term analysis as it reduces the effects of short-term fluctuations. This helps represent sustained revenue growth or reduced greenhouse gas emissions, energy consumption, and water usage per revenue unit.

CAGR is calculated using the following formula:

Equation 3.4.

$$CAGR = \left(\frac{V_f}{V_i}\right)^{\left(\frac{1}{n-1}\right)} - 1$$

Where:
V_f = Final year value (2022-23)
Vi = Base year value (2018-19)
n = Number of years (5)

Independent Variables

Corporate Environmental Sustainability Performance (CESP)

- **Compound Annual Growth Rate of Greenhouse Gas Emissions Intensity ($CAGR_{GI}$ / CAGR GI)**

The CAGR of Greenhouse Gas Emissions Intensity measures the year-on-year annual rate of change in greenhouse gas emissions per unit of revenue over five years. This metric shows the rate of year-on-year reduction in the Scope 1 and Scope 2 GHG Emissions of the Company relative to its revenue growth.

The formula for the calculation of CAGR of GHG Emissions Intensity (GI) is given below:

Equation 3.5.

$$CAGR_{EI} = \left(\frac{GI_{2022-23}}{GI_{2018-19}}\right)^{\frac{1}{4}} - 1$$

$GI_{2022-23}I$ = GI Final year value (2022-23)
$GI_{2018-19}$ = GI Base year value (2018-19)

- **Compound Annual Growth Rate of Energy Consumption Intensity ($CAGR_{EI}$/CAGR EI)**

The CAGR of Energy Consumption Intensity (CAGR GI) measures the annual rate of change in energy consumption per revenue unit over five years.

This metric shows the rate of improvement in CESP by a reduction in energy usage per year relative to the revenue generated by the business.

The formula for the calculation of GHG Intensity is given below:

Equation 3.6.

$$CAGR_{EI} = \left(\frac{EI_{2022-23}}{EI_{2018-19}}\right)^{\frac{1}{4}} - 1$$

$EI_{2022-23}$ = *EI Final year value (2022-23)*
$EI_{2018-19}$ = *EI Base year value (2018-19)*

- **Compound Annual Growth Rate of Water Consumption Intensity ($CAGR_{Wi}$ / CAGR WI)**

  The CAGR of Water Consumption Intensity measures the annual rate of change in water usage per unit of revenue over five years. This metric shows the year-on-year rate of reduction in water consumption compared to the company's revenue.

  The formula for the calculation of Water Consumption Intensity is given below:

Equation 3.5.

$$CAGR_{EI} = \left(\frac{WI_{2022-23}}{WI_{2018-19}}\right)^{\frac{1}{4}} - 1$$

$WI_{2022-23}$ = *WI Final year value (2022-23)*
$WI_{2018-19}$ = *WI Base year value (2018-19)*

Dependent Variables:

Sustained Financial Performance (SFP)

Accounting-based measures

- **Return on Equity (ROE):**

Return on Equity (ROE) measures a company's profitability by comparing the profit with the money that the shareholders have invested. It is an indicator of financial performance and is calculated as follows:

Equation 3.6.

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

Average ROE (ROE AVG) over 5 Years is calculated to assess long-term performance and indicates sustained profitability. A consistent or increasing average ROE over time shows good financial health.

- **Return on Assets (ROA):**

Return on Assets (ROA) measures the efficiency of a company's assets in producing profits. ROA is calculated as follows:

Equation 3.7.

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$$

Average ROA (ROA AVG) is calculated over five years to assess consistent asset utilisation and profitability.

- **Price-to-Book Ratio (P/B or PB)**

The Price-to-Book (P/B) ratio shows a company's market value relative to its book value. It is calculated as:

Equation 3.8.

$$\text{P/B Ratio} = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$$

The average P/B Ratio (PB AVG) over five years provides a long-term perspective on a company's valuation. A higher P/B ratio may indicate that the company's market values are highly relative to its book value, whereas a lower P/B ratio indicates undervaluation.

- **Tobin's Q (TQ)**

Tobin's Q ratio measures the market value of a firm's assets compared to the replacement cost of those assets. It is calculated as:

Equation 3.9.

$$\text{Tobin's Q} = \frac{\text{Market Value of Firm}}{\text{Replacement Cost of Firm's Assets}}$$

Average Tobin's Q (TQ AVG) over five years is calculated to provide an understanding of the company's sustained market valuation relative to its assets' cost. The book value of the assets is used as a proxy for the replacement cost of the firm's assets. A Tobin's Q of more than one indicates that the market value exceeds the replacement cost, indicating that the market expects high growth or profitability. A Tobin's Q less than one shows undervaluation by the market.

- **CAGR of Revenue (REV_{CAGR} / REV CAGR):**

The Compound Annual Growth Rate (CAGR) of Revenue measures a company's revenue's mean annual growth rate year on year over five years, assuming the growth occurs steadily. It is calculated as:

Equation 3.10.

$$REV_{CAGR} = \left(\frac{Rev_e}{Rev_s}\right)^{\frac{1}{n-1}} - 1$$

were,
Rev_e =Revenue in the final year (2022-23)
Rev_s= Revenue in the beginning year (2018-19)
n=no. of years

CAGR of Revenue indicates the rate at which a company's revenue grows annually. A higher CAGR reflects strong growth and can be a positive signal for investors.

Operational variables for hypothesis testing

- Independent Variable: Corporate Environmental Sustainability Performance (CESP)
- Operational Definition: CESP reflects a company's environmental sustainability practices based on reduction in its emission intensity, energy intensity, and water intensity.
- Measurement:
    - Composite Rank (CESPRK): Companies were ranked (1 = Leader, 2 = Mid Performer, 3 = Laggard) based on performance on the normalised intensity reduction indicators.
    - Binary Grouping (cespbin): For groupwise comparisons, companies were classified into two categories:
        - 1 = High CESP (Leaders)
        - 2 = Low CESP (Mid + Laggards)

- Sector Classification (SECGROUP): Companies were also classified into two environmental impact categories to test sectoral effects:
  - 1 = High Environmental Impact (Metals, Oil & Gas, Cement, Chemicals)
  - 2 = Low Environmental Impact (Auto, FMCG, Healthcare, Others)

- Dependent Variable: Sustained Financial Performance (SFP)
  - Operational Definition: SFP measures long-term financial performance and market perception of firms.
  - Measurement:
    - Financial Indicators: Return on Equity (ROE), Return on Assets (ROA), Price-to-Book ratio (PB), Revenue CAGR, and Tobin's Q were calculated over five years (2019–2023).
    - Composite Rank (SFPRK): These indicators were normalised, and firms were ranked (1 = Leader, 2 = Mid Performer, 3 = Laggard) for SFP.

- Control Variables
  - No firm-level controls (size, leverage, etc.) were included due to the l
  - imited sample (N = 30).

Table 3.1. Variable Summary Table

Variable	Type	Values / Scale	Source
CESPRK	Ordinal (Rank)	1 = Leader 2 = Mid 3 = Laggard	Computed from environmental intensity
Cespbin	Binary	1 = High CESP 2 = Low CESP	Derived from CESPRK
SECGROUP	Binary	1 = High Impact Sector 2 = Low Impact Sector	Sector classification
SFPRK	Ordinal (Rank)	1 = Leader 2 =Mid 3 = Laggard	Computed from ROE, ROA, PB, Revenue CAGR, Tobin's Q

3.6. Data Analysis

Business entities and sectors exhibit unique attributes and factors influencing Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP). Considering the varied characteristics of data and the limited number of companies in each sector, data analysis is conducted based on data visualisations, trend analysis, percentile rankings, relative sectoral performance, leadership categorisation, supplemented with correlation, non-parametric tests and ordinal logistic regression.

Testing the Hypotheses

Diverse analytical, statistical and visual techniques were used to test the hypotheses, including trend analysis, relationship analysis, sectoral analysis, percentile analysis, leadership rankings, correlation, regression, and qualitative analysis of sustainability practices. This provides a comprehensive framework

for understanding the nuanced relationship between CESP and SFP. It allows for identifying trends, sectoral insights, leaders and laggards, sustainability practices and their impact on financial performance. This offers insights into corporate strategy, policy implications, and theoretical contributions.

1. Data Description

Preliminary data analysis summarises the data collected, giving an overview of the sample characteristics for the selected companies and the Corporate Environmental Sustainability Performance (CESP) over the past five years. This helps to understand the key patterns, impacts, and categories of environmental footprint and impacts of the selected companies for detailed data analysis.

2. Trend Analysis

Trend Analysis reveals the overall trends in the data over the five years. It shows whether companies are pursuing sustained improvement in CESP metrics and consistency of financial performance over time.

3. CESP and SFP change analyses

This analysis measures the compound annual rate of change (CAGR). It shows the direction and quantum of change in each company's independent variables, GHG Emissions Intensity (GI), Energy Consumption Intensity (EI), and Water Consumption Intensity (WI) over five years. The analysis of the dependent variables includes a 5-year average of SFP accounting and market-based measures, and the Compound Annual Rate of revenue growth shows consistency in financial performance for each company. This analysis also compares company performance data within the CESP and SFP variables.

4. Relationship Analysis

Data categorisation, summarisation, comparison and visualisation are used to identify relationships and patterns between the variables. The CESP variables are correlated with the SFP accounting-based measures, market-based measures, and revenue growth. Outliers and relationships are identified within the data variables.

5. Company Percentile Rankings

The companies are ranked based on their CESP and SFP metrics. Percentiles are calculated for the variables, identifying top and bottom performers within sectors. Range-based percentile rankings provide a comparative performance measure for the identification of top performers and areas needing improvement. This analysis highlights the relative standing of companies in terms of their environmental sustainability and financial performance.

6. Sector-Specific Analysis

Sectoral Analysis highlights differences between sectors, identifying which are more successful in integrating sustainability with financial performance.

Percentile, rankings, and sectoral average analysis cover each sector's CESP and SFP metrics, identifying sector-specific trends and leaders. The analysis at the company level within the sectors helps identify companies with above-average reductions in CESP (i.e., negative values for CAGR GI, CAGR EI, and CAGR WI) and companies with above-average financial performance (i.e., high values for ROE, ROA, PB, TQ and Revenue CAGR).

7. High and Low environmental impact sectors

Some sectors are more environmentally sensitive due to the nature of their operations, regulatory pressures, and societal expectations. Industries like metals, cement, chemicals, and oil gas are more environmentally sensitive due to their high resource use, energy consumption, the release of emissions, regulatory scrutiny, and public expectations. Sectoral Leadership Analysis

Sectoral leadership analysis, based on percentile analysis and sectoral average scores for CESP and SFP, is used to classify leaders, mid-performers, and laggards. The visualisation of sectoral leaders and laggards based on CESP and SFP is used to map the key relationships between CESP and SFP.

3.7. Hypothesis testing

The statistical methods for hypothesis testing include data transformation, correlation, non-parametric tests, and regression testing.

Data Transformation and Preparation

- All CESP intensity indicators were normalised.
- Ranks were computed and transformed into ordinal categories for logistic regression.
- Assumptions for non-parametric tests were verified due to the ordinal nature of rankings and non-normality in some distributions.

Statistical Tools and Tests

The analysis was conducted in IBM SPSS Statistics using the following tests:

Test	Purpose
Spearman's Correlation	To assess monotonic associations between CESP indicators and SFP metrics
Mann–Whitney U Test	To compare the financial performance between the CESP leader and other groups
Ordinal Logistic Regression	To predict SFP ranks using CESP ranks (with and without sector grouping)

All tests were conducted with a significance level of $\mathbf{p < 0.05}$.

3.8. Qualitative Analysis

Qualitative analysis helps understand the specific sustainability practices contributing to CESP and their impact on SFP. The analysis of company reports and disclosures helps to understand effective sustainability practices and their financial implications. This involves common themes, challenges, and best practices in environmental sustainability to provide insights into factors influencing CESP and their impact on corporate strategy. An analysis of the revenue trends and phases of downturn or low growth and recovery is carried out to highlight the degree of SFP resilience of the companies.

3.9. Data Collection

Quantitative data on CESP metrics (CAGR of emissions intensity, CAGT of energy intensity, CAGR of water intensity) and SFP metrics (ROE, ROA, price-to-book ratio, CAGR of revenue, Tobin's Q) and qualitative data for the 30 companies over the past five years are collected from annual reports, Company websites, Sustainability reports, ESG disclosures, and financial databases (e.g.,

Moneycontrol.com). Supplementary data is collected from industry reports and scholarly articles.

Table 3.1. List of Sample Companies

	Company name	Industry	Sector category*
1	Tata Steel Ltd.	Metals	Metals
2	JSW Steel Ltd.	Metals	Metals
3	Hindalco Industries Ltd.	Metals	Metals
4	Hindustan Zinc	Metals	Metals
5	UltraTech Cement Ltd.	Cement	Cement
6	Shree Cement Ltd.	Cement	Cement
7	GAIL (India) Ltd.	Oil & Gas	Oil & Gas
8	Oil & Natural Gas Ltd.	Oil & Gas	Oil & Gas
9	Indian Oil Ltd.	Oil & Gas	Oil & Gas
10	Power Grid of India Ltd.	Utilities	Others
11	UPL Ltd.	Chemicals	Chemicals
12	Asian Paints Ltd.	Consumer durables	Others
13	Grasim Industries Ltd.	Chemicals	Chemicals
14	Pidilite Industries Ltd.	Chemicals	Chemicals
15	Larsen & Toubro Ltd.	Construction	Others
16	Titan Company Ltd.	Consumer durables	Others
17	Hindustan Unilever Ltd.	FMCG	FMCG
18	Britannia Industries Ltd.	FMCG	FMCG
19	Marico Ltd.	FMCG	FMCG
20	Dabur India Ltd.	FMCG	FMCG
21	ITC Ltd.	Diversified	Others
22	Hero MotoCorp Ltd.	Auto	Auto
23	Maruti Suzuki India Ltd.	Auto	Auto
24	Mahindra & Mahindra Ltd.	Auto	Auto
25	Eicher Motors Ltd.	Auto	Auto
26	Tata Motors Ltd.	Auto	Auto
27	Dr Reddy's Ltd.	Healthcare	Healthcare
28	Sun Pharmaceutical Industries Ltd.	Healthcare	Healthcare
29	Divi's Ltd.	Healthcare	Healthcare
30	Cipla Ltd	Healthcare	Healthcare

4. Data Analysis

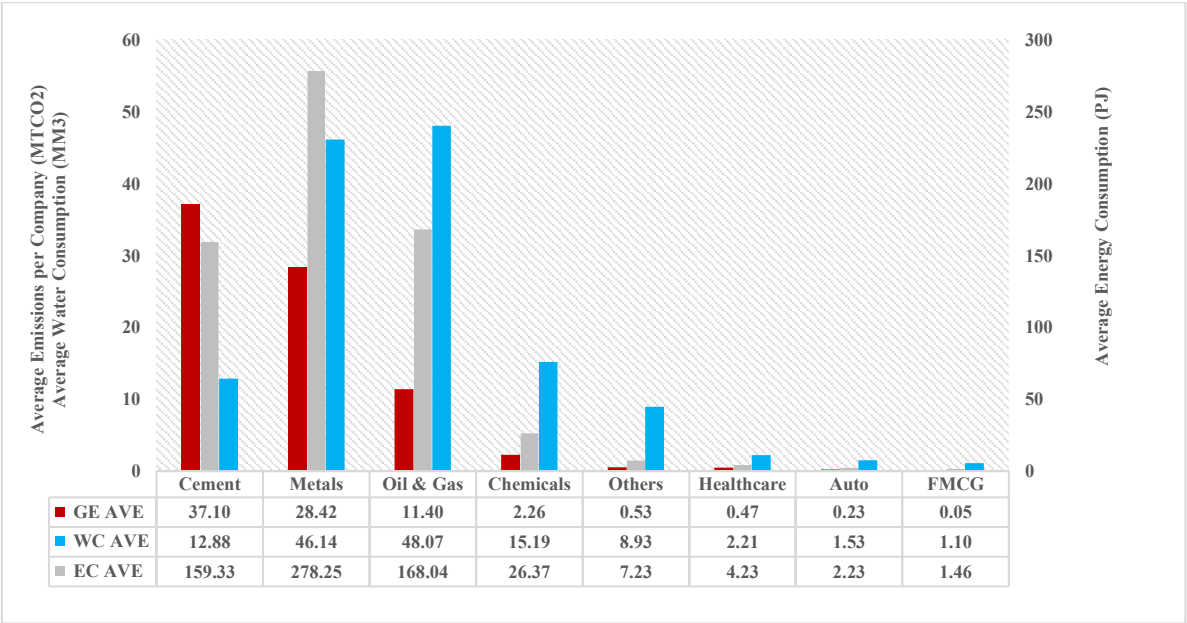
This Section shows the data tables, visual charts, findings, and observations from the analysis of sample variables. The discussion and interpretation of the findings from the data analysis are provided in Chapter 6 – Discussion and Interpretation. The data is based on the standalone environmental and financial metrics reported by the companies.

4.1. Data description

Preliminary data analysis summarises the collected data, giving an overview of the sample characteristics for the selected companies, focusing on Corporate Environmental Sustainability Performance (CESP) data over the past five years.

Figure 4.1 provides insights into the data related to the environmental impact and footprint of industry sectors shown by their average absolute greenhouse gas (GHG) emissions, energy consumption, and water consumption.

Figure 4.1. Average Absolute CESP by Industry



	Cement	Metals	Oil & Gas	Chemicals	Others	Healthcare	Auto	FMCG
GE AVE	37.10	28.42	11.40	2.26	0.53	0.47	0.23	0.05
WC AVE	12.88	46.14	48.07	15.19	8.93	2.21	1.53	1.10
EC AVE	159.33	278.25	168.04	26.37	7.23	4.23	2.23	1.46

Absolute CESP indicators

1. Average Annual GHG Emissions (GE AVG)

This measures the absolute average emissions of greenhouse gases by companies within each sector, expressed in million tons of CO2 equivalent (MTCO2). The GHG emissions include Scope 1 and Scope 2 emissions.

2. Average Annual Energy Consumption (EC AVG)

This shows the average energy companies consume within each sector, expressed in petajoules (PJ). One PJ equals one million gigajoules (GJ).

3. Average Annual Water Consumption (WC AVG)

This measures the absolute average water companies use within each sector, expressed in million cubic meters (MM3), with one MM3 equal to one million kilolitres (KL).

Key Observations

The companies in the Metals, Cement, Oil and gas sectors have significantly high GHG emissions, Energy consumption, and Water consumption, compared to the other sectors.

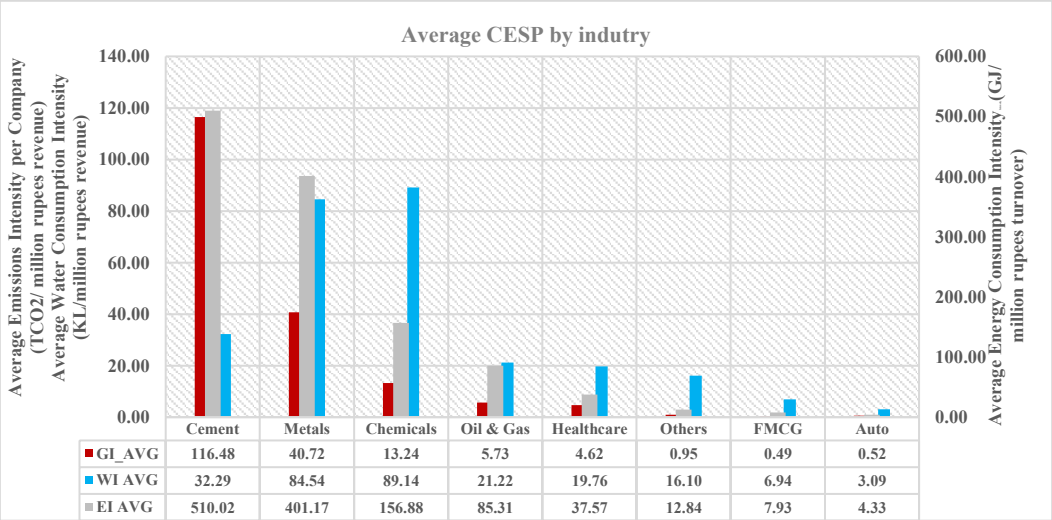
- The Cement Sector companies have the highest average GHG emissions, followed by the Metals, Oil & Gas, and Chemical sectors. The emissions are generated from the chemical process of clinker production in the Cement industry and smelting and refining processes in the metals industry. The Oil and gas sector generates high GHG emissions from operational activities and the combustion of extracted fuels.

- The Metals and Oil & Gas Sector companies use the most energy in their production processes, followed by the Cement sector. The Chemicals sector companies use moderate energy for production processes.
- The Chemicals and Metals sector has a very high-water consumption to cool and prepare raw materials and drilling, extraction, and refining processes. The cement, and Oil and gas sectors have comparatively moderate water consumption,
- The FMCG, Healthcare, and Auto sectors have lower emissions than heavy industries. Energy consumption is moderate and associated with manufacturing. However, packaging and distribution. Water usage is moderate in FMCG, especially in food and beverage production.
- Other sectors (including Consumer Durables, diversified, and construction) exhibit varied but lower GHG emissions depending on specific industry activities. Energy consumption varies widely, from higher in construction to moderate in consumer durables. Water usage also varies, with construction requiring higher water consumption for material preparation and consumer durables using low volumes of water.

CESP Intensity Indicators

Figure 4.2 shows the sector-wise Average Annual Emissions Intensity (GI AVG), Average Annual Energy Intensity (EI AVG), and Average Annual Water Intensity (WI AVG).

Figure 4.2. Average CESP Intensity by Industry



GHG Intensity (GI), Energy Consumption Intensity (EI), and Water Consumption Intensity (WI) are measured as Absolute GHG Emissions (GE), Energy Consumption (EC), and Water Consumption (WC), each divided by Revenue in million rupees, respectively.

1. Average GHG Emissions Intensity (GI AVG)

This measures the average of the absolute annual emissions of greenhouse gases by companies within each sector, expressed in tons of CO2 equivalent (TCO2) divided by Annual Revenue in million rupees.

2. Average Energy Consumption Intensity (EI AVG)

This shows the average of the Annual energy consumed by companies within each sector, expressed in Gigajoules (GJ) divided by Annual Revenue in million rupees.

3. Average Annual Water Consumption (WC AVG)

This reflects the average of the Annual water consumed by companies within each sector, expressed in Kilolitres (KL) divided by Annual Revenue in million rupees.

Key Observations

- The companies in the Cement industry have the highest average GHG emissions intensity (GI), reflecting significant greenhouse gas emissions per unit of revenue. The Cement sector also shows the highest average energy consumption intensity.
- The companies in the Metals industry exhibit high average GHG emissions intensity and absolute emissions. They have high Energy Intensity and very high average water consumption intensity.
- Chemical industry companies have moderate absolute emissions and intensity of emissions. Absolute energy consumption and energy intensity are also moderate. Water intensity is the highest in the Chemicals industry.
- The companies in the Oil and gas sector have lower average GHG Emission intensity, Energy consumption intensity, and Water consumption intensity compared to the metals, cement, and oil and gas sector companies, reflecting a lower environmental footprint relative to their revenue.
- The companies in the healthcare, auto, pharma, and other sectors show very low GHG emissions and energy and Water consumption intensities,

reflecting minimal greenhouse gas emissions and lower resource use relative to revenue.

High and Low Environmental Impact Sectors

The sectors have been classified in Table 4.1 as High Environmental Impact (HEI) and Low Environmental Impact (LEI) to help understand the CESP performance and related SFP performance based on the materiality of environmental impacts and footprint. Companies in companies

4.2. Trend Analysis - CESP

Figures 4.3 to 4.8 show the trends in GHG Emissions intensity (GI), Energy intensity (EI), and Water intensity (WI) for selected sectors and companies over five years from the financial year 2018-19 to 2022-23.

GHG Emissions Intensity (GI)

Figure 4.3. GHG Emissions Intensity Trends by Sector

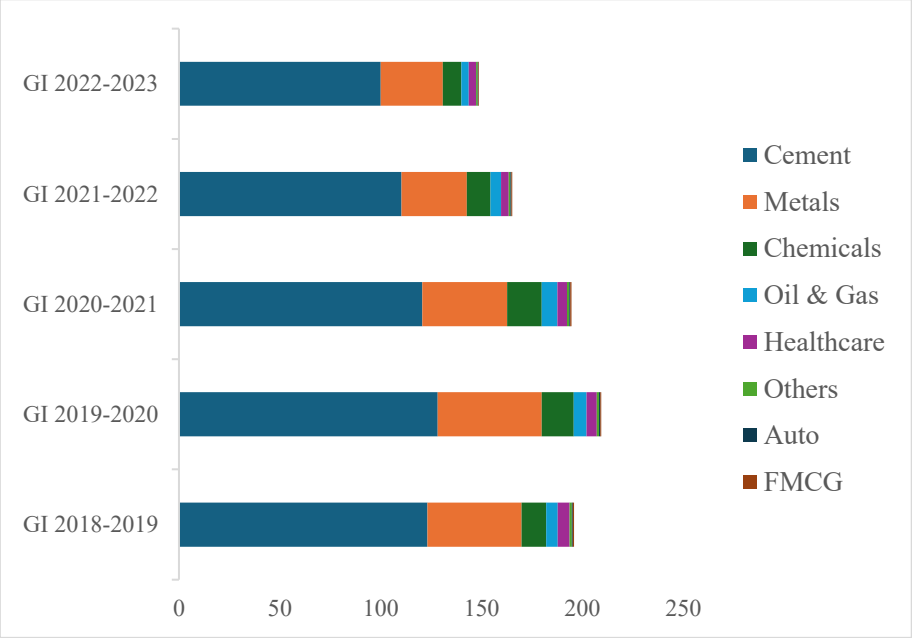
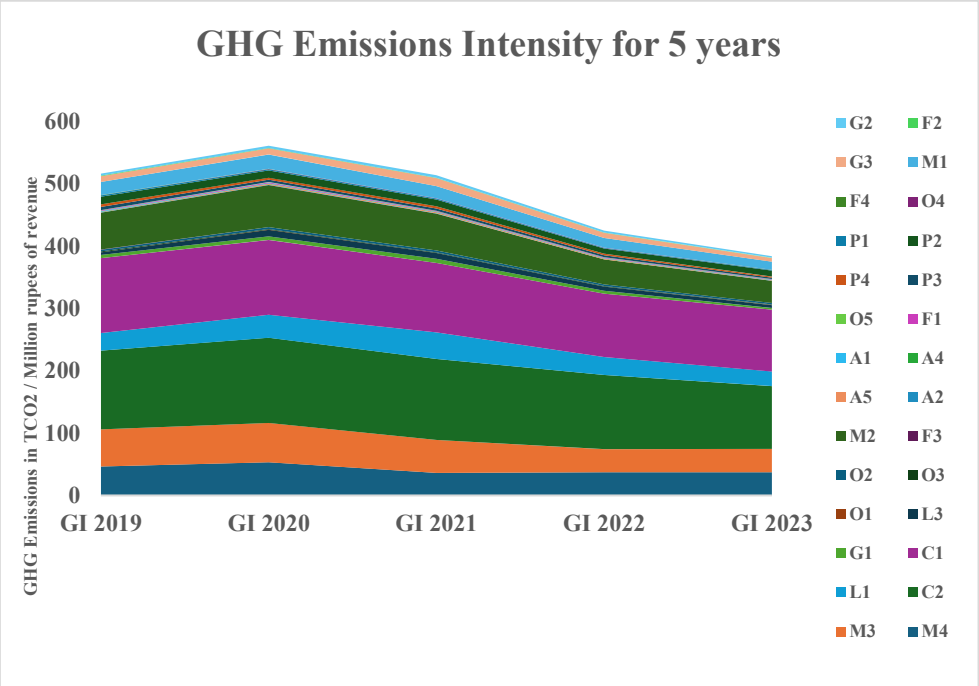


Figure 4.4. GHG Emissions Intensity Trends by Company



General trend

GHG Emissions Intensity (GI) over the five years shows a decreasing trend across all the companies, indicating improvements in operational efficiency and reduced emissions per unit of revenue from the base year 2018-19. There is an overall increase in the emissions intensity in 2019-20 for the Cement, Metals, & Auto sectors and in the year 2020-21 for the Oil & Gas sector, followed by a noticeable downward trend after 2020-21.

Energy Intensity (EI)

Figure 4.5. Energy Consumption Intensity Trends by Sector

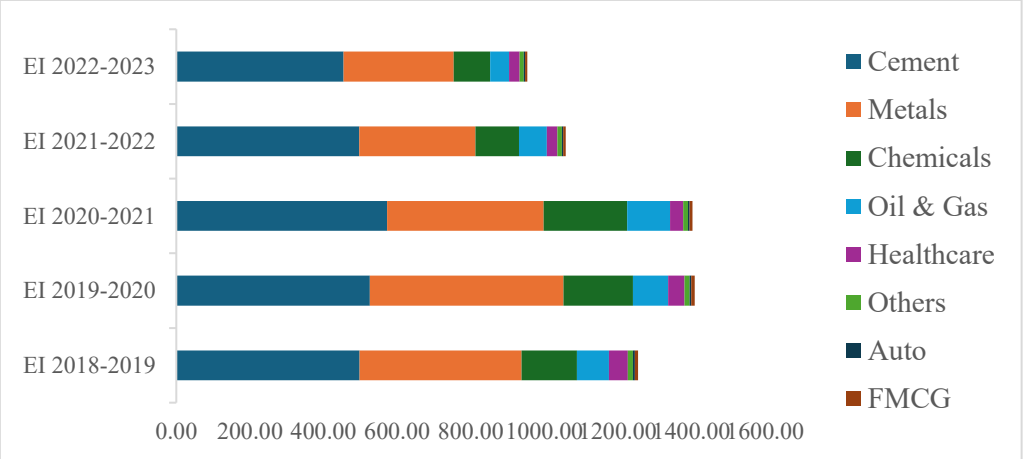
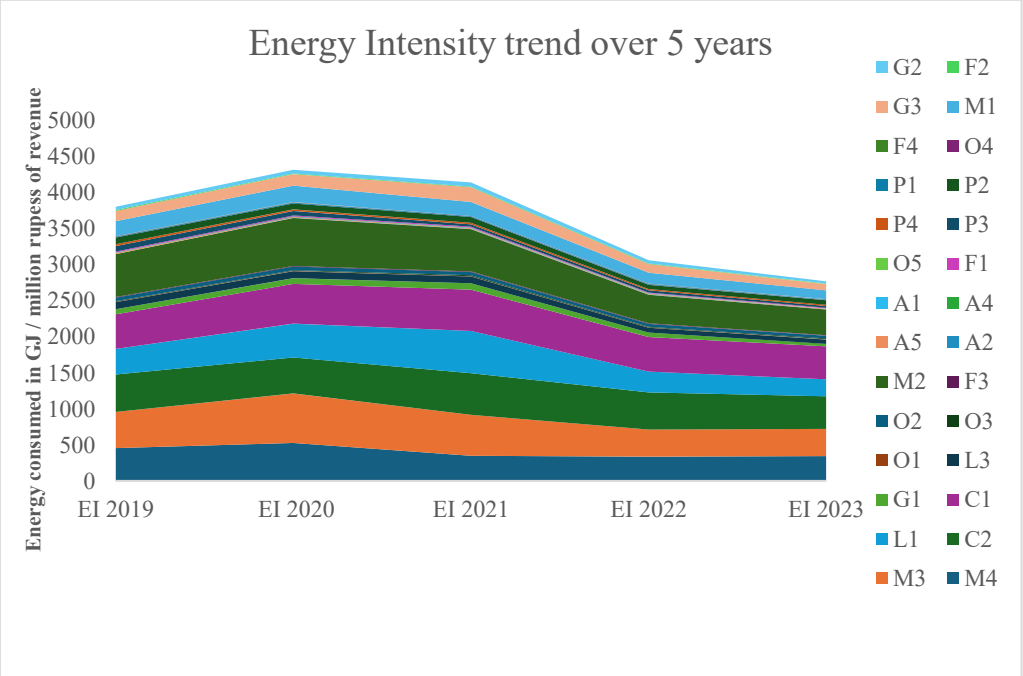


Figure 4.6. Energy Consumption Intensity Trends by Company



General Trend

Energy Intensity also generally shows a decreasing trend from the base year 2018-19 to the year 2022-23, indicating improved energy efficiency across various companies. There is an increase in the energy intensity in the year 2019-20, followed by a noticeable downward trend from the year 2021-22.

Water Intensity (WI)

Figure 4.7. Water Consumption Intensity Trends by Sector

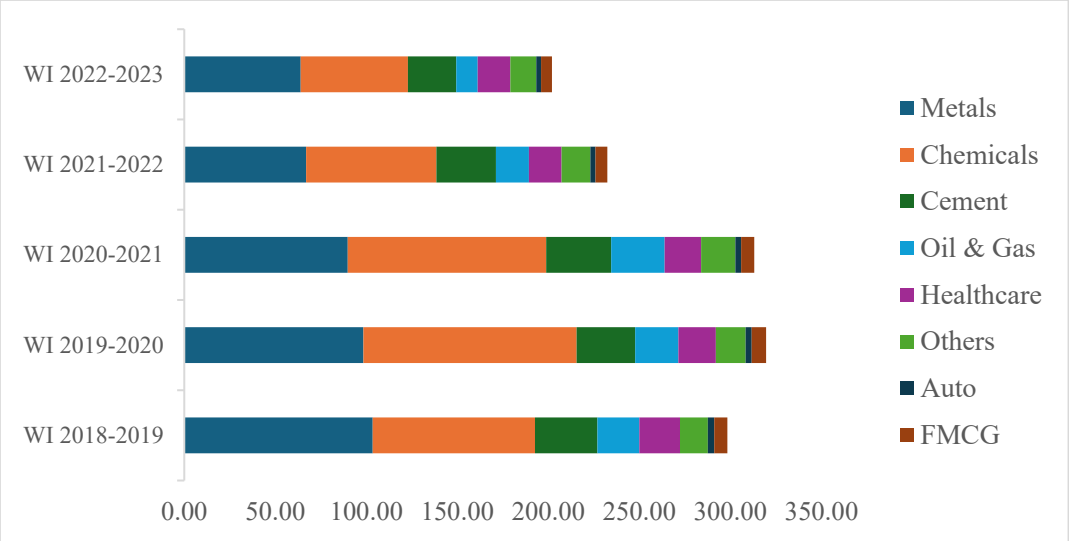
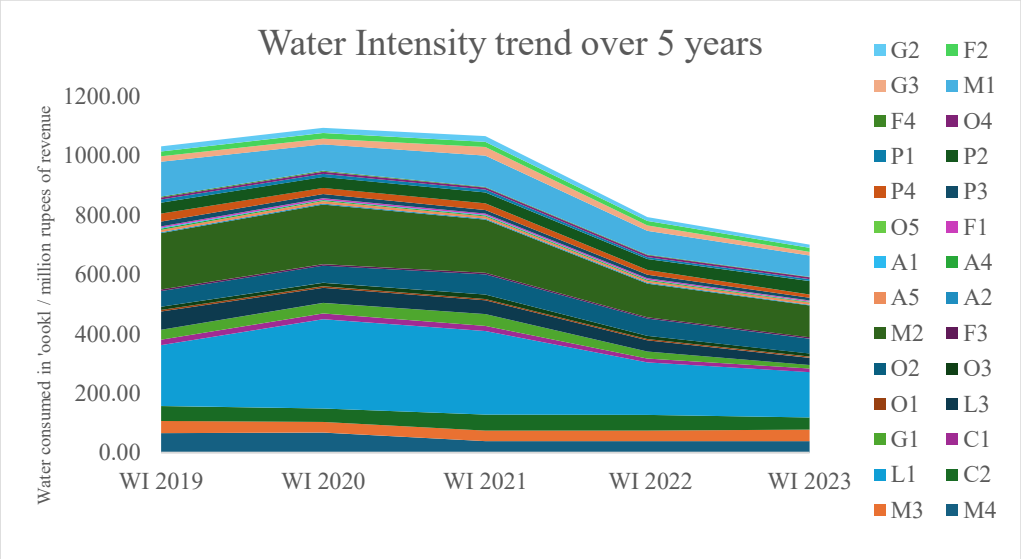


Figure 4.8. Water Consumption Intensity Trends by Company



General Trend

Water Intensity (WI) also shows a decreasing trend across most companies, indicating improved water usage efficiency relative to revenue over the five

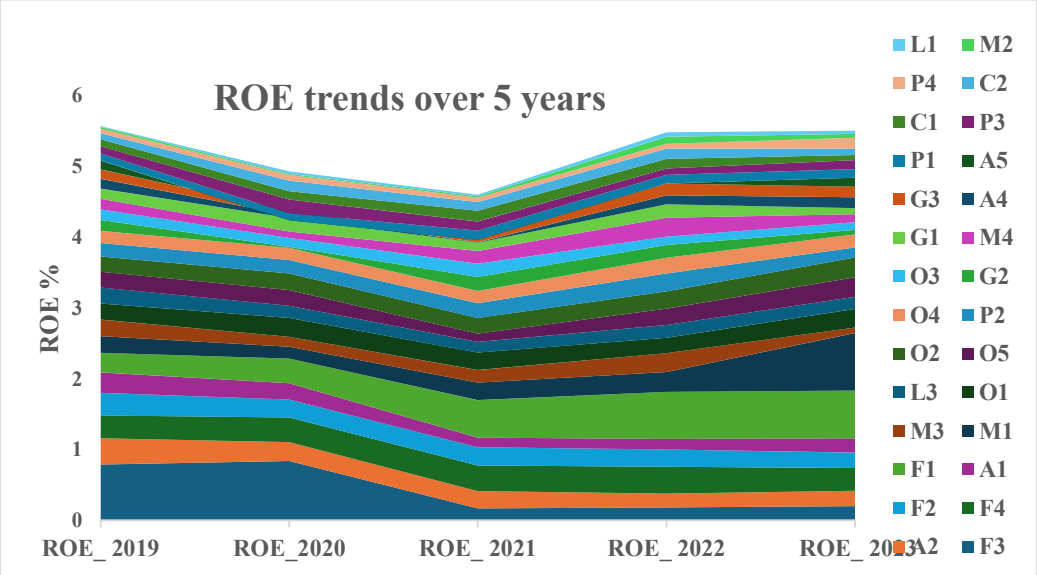
years. There is a slight increase from 2018-19 to 2020-21 and a noticeable reduction in WI from 2020-21 to 2022-23.

4.3. Trend Analysis - SFP

Figures 4.9 to 4.13 show the trends in ROE, ROA, P/B ratio, Tobin's Q and Revenue for the selected companies over five years from the financial year 2018-19 to 2022-23.

Return on Equity (ROE)

Figure 4.9. SFP -ROE trends

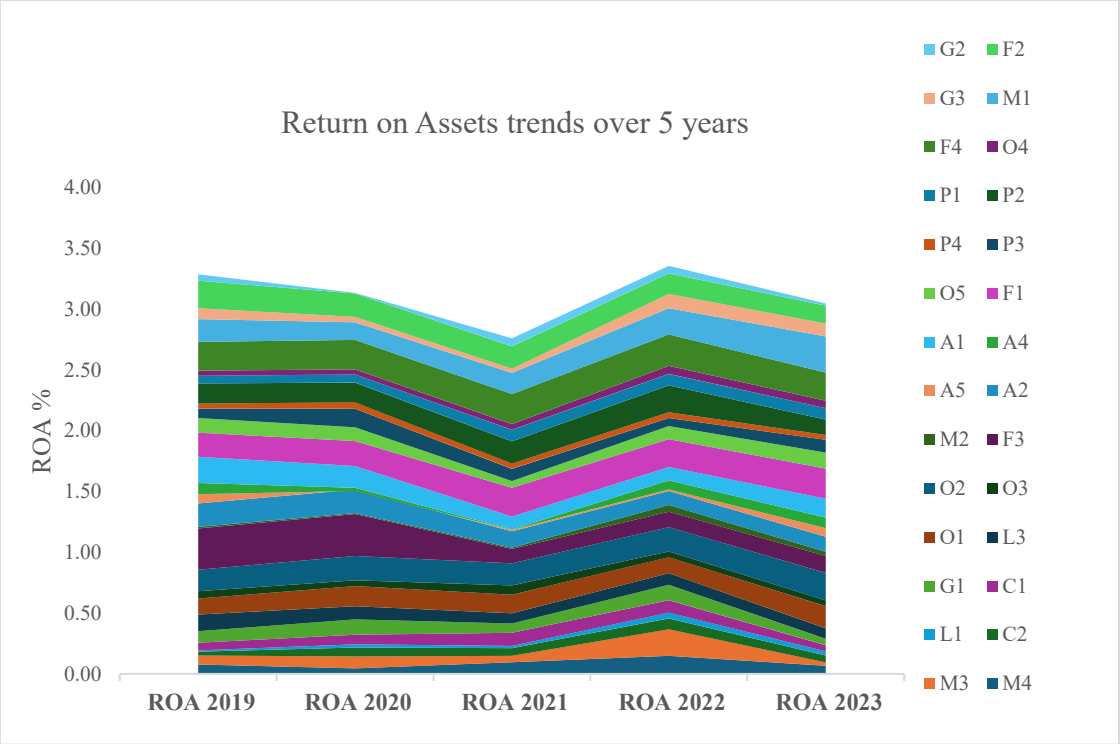


General Trend

ROE shows fluctuations over the five years for most companies, with some companies experiencing significant changes. There is an overall reduction in average ROE in the pandemic years 2019-20 and 2020-21, which has subsequently recovered in the year 2022-23.

Return on Assets (ROA)

Figure 4.10. SFP -ROA trends



General Trend

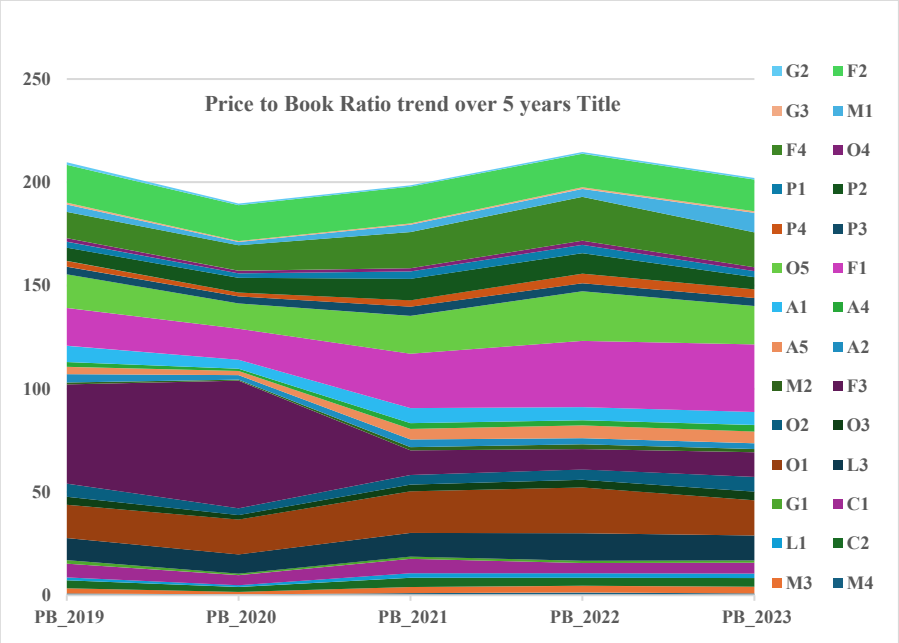
ROA shows a similar trend to ROE, with fluctuations across the period, a downtrend in 2019-20 and a subsequent recovery in the year 2021-22.

Key observations on trends in accounting-based measures

- Increasing ROE and ROA: F1, M1, and O2 show strong financial performance with increasing ROE and ROA.
- Decreasing ROE and ROA: M3 and G1 exhibit decreasing ROE and ROA trends.
- Fluctuating Performance: A5 and G3 show significant fluctuations in ROE and ROA.

Price to Book Ratio (PB)

Figure 4.11. SFP - P/B trends

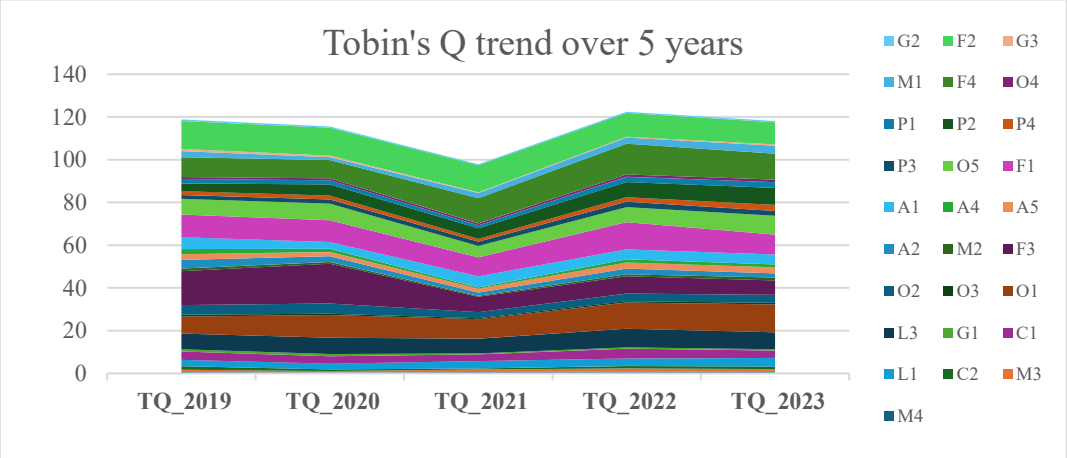


General Trend

The PB ratio shows fluctuations over the five years for most companies, with a few companies, such as F3 and F1, experiencing significant changes.

Tobin's Q

Figure 4.12. SFP - Tobin's Q trends



General Trend

Tobin's Q also shows fluctuations over the period, with large changes for some companies. The noticeable downtrend in 2019-20 and 2020-21 has been reversed, and there is a significant uptrend in the year 2021-22.

Key observations on trends in Market-based measures – PB and Tobin's Q

i. Increasing PB and TQ: All Pharma companies, O1, M1, F1 and F4 show strong market valuation with increasing PB and TQ.

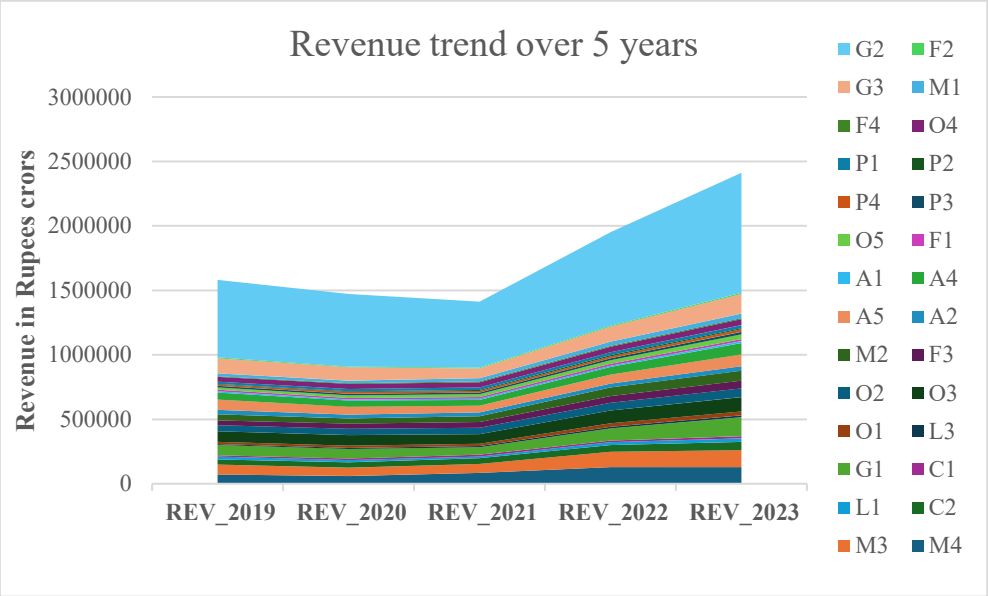
ii. Decreasing PB and TQ: All the Oil & Gas sector companies and Companies like F3, A2, A3 & M4 exhibit decreasing PB and TQ trends.

iii. Fluctuating Performance: A5 and G3 show significant fluctuations in PB and TQ.

Revenue

The trend analysis of revenue over five years provides insights into the business growth of these companies:

Figure 4.13. SFP - Revenue trends



General Trend

Revenue shows an increasing trend over the five years for most companies. G2, M3, and G1 show strong business growth with substantial revenue increases. O1, F1, and P1 show moderate revenue growth, whereas A and A2 exhibit fluctuations in revenue. F4 and L2 have reported slight increases in revenue over the past five years. There is an overall declining trend in 2019-20 and 2020-21, and a sharp recovery and significant uptrend in 2021-22 and 2022-23.

4.4. CESP improvement analysis

The CESP improvement analysis provides insights into the direction and magnitude of changes in the GI, EI, and WI metrics and their impacts over the five years. Table 4.2 shows the CESP improvement metrics over the five years.

GHG Emissions

- **CAGR GHG Emissions (CAGR GE):**

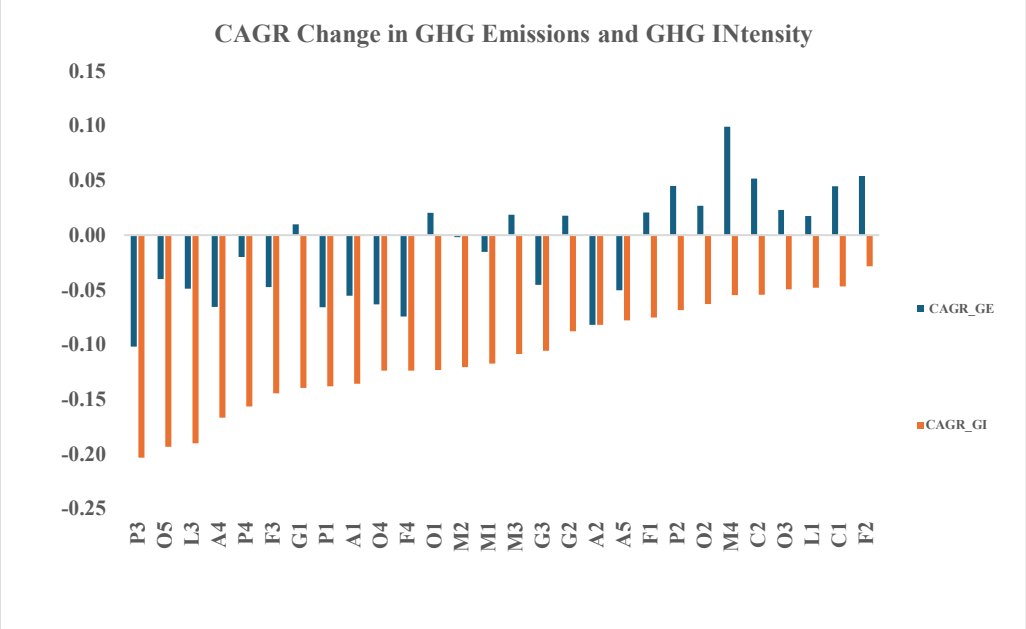
This metric measures the company's compound annual rate of change in total greenhouse gas emissions from 2018-18 to 2022-23. Positive values indicate an increase in the company's absolute GHG emissions.

- **CAGR Emissions Intensity (CAGR GI):**

This measures the compound annual rate of change of greenhouse gas emissions per revenue unit between 2018-19 to 2022-23. A negative value indicates improved efficiency, with reduced emissions relative to revenue growth.

Figure 4.14 shows the CAGR of absolute GHG Emissions and the CAGR of GHG Emissions Intensity during the 5 years.

Figure 4.14. CAGR GHG Emissions and Intensity



Key Findings

The change in the average GHG emissions of the selected companies ranges from a 10% (CAGR 10%) increase to a reduction of 17% (CAGR -17%), with an average compound average rate of 1% (CAGR -1%) reduction. The change in

the average GHG Emissions intensity ranges from a decrease of 27% (CAGR -27%) to 3% (CAGR -3%), with an average overall reduction of 11% (CAGR -11%).

Companies with an increase in Absolute Emissions

M4 exhibits the highest rate (10%) of Compound annual growth rate increase in absolute GHG emissions over five years, followed by L3 (7%). There is a reduction in the intensity of emissions of M4 (-5%) and L3 (-11%). F2, L1, and C2 also show a growth rate in absolute emissions, but with moderate reductions in emissions intensity.

Companies with a reduction in Absolute Emissions

Companies such as M1 (-12%) and A4 (-10%) have achieved a reduction in emissions intensity and show a decrease in absolute emissions. G3 (-11%) and F3 (-14%) show significant absolute emissions and emissions intensity reductions.

Companies with the most significant reductions in Emissions Intensity

P3 (-20%) and L2 Industries (-27%) exhibit the largest decreases in emissions intensity. P4 (-16%) and O5 (-19%) also show significant reductions in emissions intensity.

Energy Consumption

- **CAGR Absolute Energy Consumption (CAGR EC):**

This metric measures the compound annual rate of change for total energy consumption for each company over five years. Positive values indicate an increase in energy consumption, while negative values indicate a reduction.

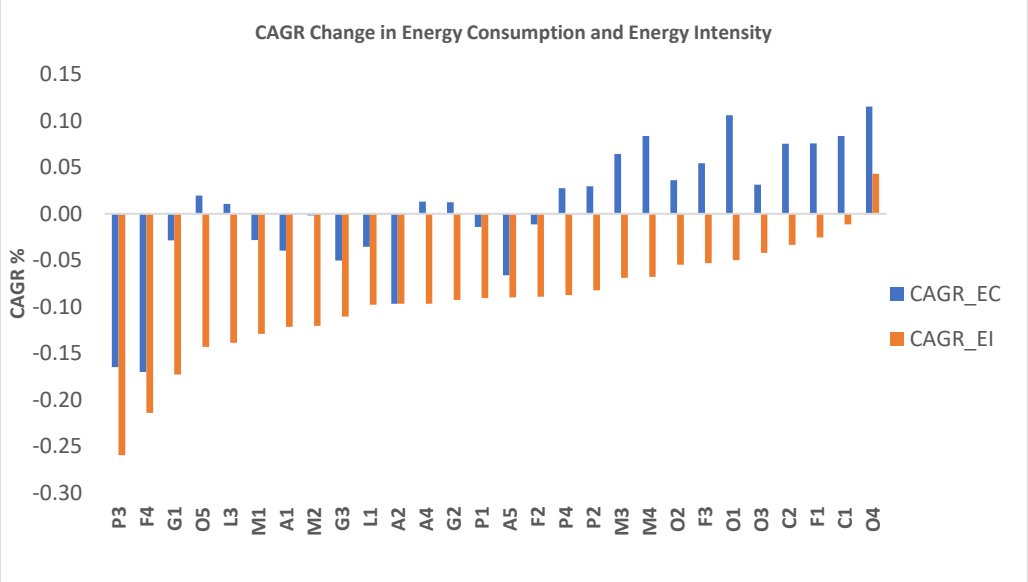
- **CAGR Energy Intensity (CAGR EI):**

This metric evaluates the compound annual rate of change in the energy consumption per revenue unit. A negative value indicates improved efficiency, with reduced energy consumption relative to revenue growth.

Figure 4.15 shows the CAGR of absolute Energy consumption and the CAGR of Energy Intensity during the 5 years.

Key Findings

Figure 4.15. CAGR Energy Consumption and Intensity



The overall trend across all companies is a 9% average annual Compound growth rate reduction in energy intensity and an insignificant overall average change in absolute energy consumption. Most companies exhibit negative growth in energy intensity.

Companies with an increase in Absolute Energy Consumption

M3 and M4 exhibit positive Compound annual growth rates for absolute energy consumption with reductions in energy intensity. O1 and O4 also show growth in absolute energy consumption, but with minor improvements in energy intensity.

Companies with Negative Growth (improvements) in Absolute Energy Consumption

A4, G1, and O5 show significant absolute energy consumption and intensity reductions.

Companies with the Most Significant Reductions in Energy Intensity

P3 and F4 exhibit the most significant decreases in energy intensity; L2 and A4 also show substantial reductions in energy intensity.

Water Consumption

- **CAGR Absolute Water Consumption (CAGR WC):**

This metric measures each company's annual growth rate of total water consumption. Positive values indicate increased water consumption, while negative values indicate a reduction.

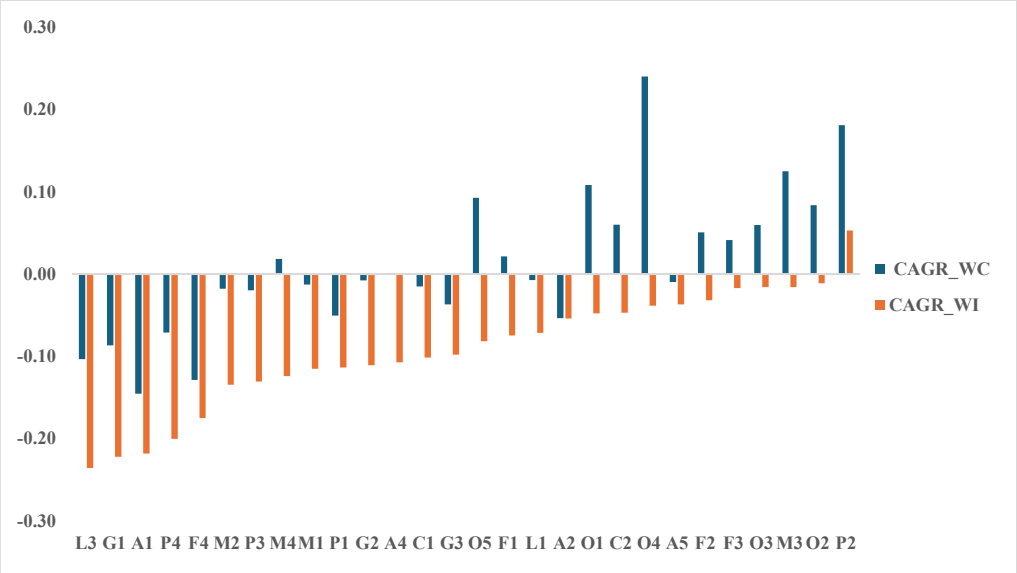
- **CAGR Water Intensity (CAGR WI):**

This metric evaluates the annual growth rate of water consumption per revenue unit. A negative value indicates improved efficiency, with reduced water consumption relative to revenue growth.

Figure 4.16 shows the CAGR of absolute Water consumption and CAGR of Water Intensity during the 5 years.

Key Findings

Figure 4.16. CAGR Water Consumption and Intensity



The overall trend across all companies shows an insignificant increase in absolute average water consumption (1%) and a 10% annual average reduction in water intensity. Most companies exhibit negative year-on-year growth in water intensity.

Companies with an increase in Absolute Water Consumption

O5, M3, P2 and O4 exhibit positive Compound annual growth rates for absolute water consumption but improvements in water intensity. O1 and F1 also show growth in absolute water consumption, but with improvements in water intensity.

Companies with Negative Growth (improvement) in Absolute Water Consumption

A1 and F4 have achieved a reduction in absolute water consumption and show a significant decrease in water intensity. P4 and P3 show significant absolute water consumption and intensity reductions.

Companies with the Most Significant reductions in Water Intensity

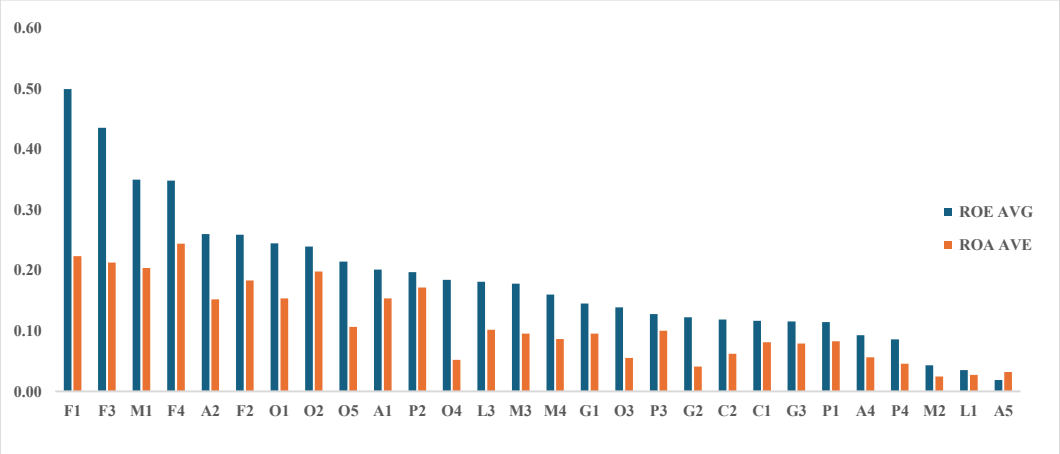
L2 and G1 exhibit the most significant decreases in water intensity.

4.5. Sustained Financial Performance (SFP)Analysis

Table 4.3 shows the SFP metrics over the five years. Figure 4.17 shows the data on the SFP accounting measure variables, Return on Equity (ROE AVG) and Return on Assets (ROA AVG):

Key Findings

Figure 4.17. SFP – Accounting-based measures



- **Return on Equity**

Top Performers

F1 (49.9%) leads with the highest 5-year average ROE, followed by F3 (43.5%), M1 (34.9%), and F4 (34.8%).

High ROE Companies

A2 (26%) and F2 (26%) show high ROE, followed by O1 (24.4%), O2 (24%), O5 (21.4%), L2 (21%), and A1 (20.11%).

Moderate ROE Companies

P2 (19.7%), O4 (18.4%), M3 (17.4%), M4 (16%), L3 (15.2%), and G1 (14.5%) have moderate ROE.

Lower ROE Companies

O3 (13.8%), P3 (12.8%), C2(11.9%), and C1 (11.6%) have lower ROE than the top performers.

Lowest ROE Companies

L1 (4%) and M2 (4.32%) show very low ROE. A5 (-7.59%) exhibits a negative ROE.

- **Return on Assets**

Return on Assets (ROA) is a financial performance metric that measures how efficiently a company uses its assets to generate profit. 5-year average Return on Assets (ROA AVG) measures the average ROA of a company over a period.

Key Findings

Top Performers in 5-Year Average ROA

F4 (24.3%) leads with the highest 5-year average ROA, followed by F1 (22.3%), F3 (21.3%), O2 (20%) and M1 (20%).

High ROA Companies

F2 (18.3%) has high ROA, followed by P2 (17.1%), L2 (15.9%), O1 (15.3%), A2 (15.2%), and A1 (15.4%).

Moderate ROA Companies

O5 (10.6%), P3 (19%), M3 (9.5%), M4 (8.6%), A4 (8.3%), and P1 (8.2%) fall in the moderate ROA category.

Lower ROA Companies

G3 (7.9%) and C2 (6.2%) have lower ROA than the top performers. O3 (5.5%) and O4 (5.18%) exhibit lower ROA.

Lowest ROA Companies

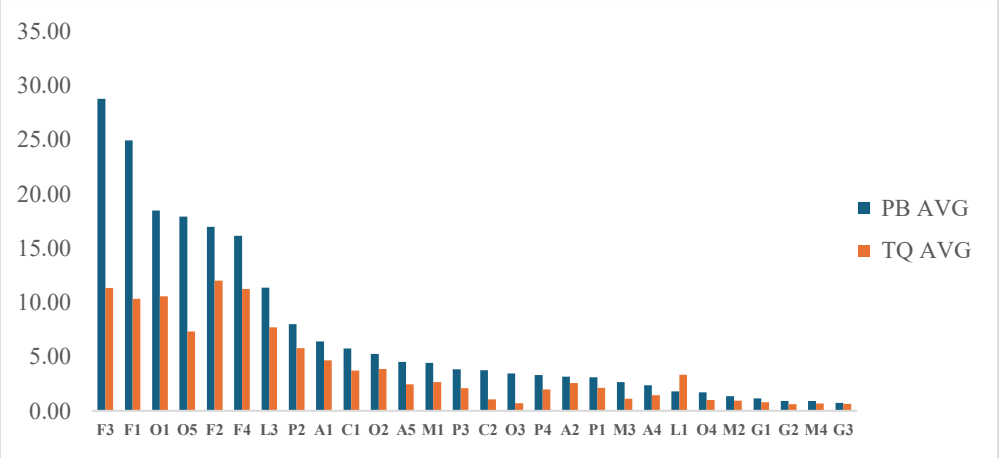
P4 (4.5%), L3 (4.4%), and G2 (4.1%) show very low ROA, whereas A5 (-1.9%) exhibits a negative ROA.

- **Price to Book ratio**

Figure 4.18 shows the data on the SFP measures Price to Book Ratio (P/B) and Tobin's Q (TQ).

Key Findings

Figure 4.18. SFP Market-based measures



Top Performers in 5-Year Average P/B Ratio

F3 (28.8) has the highest 5-year average P/B ratio, followed by F1 (24.9) and O1 (18.5).

High P/B Ratio Companies

O5 (17.9), F2 (17), L2 (16.7), and F4 (16.1) show high Price-to-book ratios.

Moderate P/B Ratio Companies

P2 (8), A1 (6.4), L3 (6.1), and C1 (5.7) have moderate P/B ratios. O2 (5.2), A5 (5.1), and M1 (4.4) also fall in the moderate P/B category.

Lower P/B Ratio Companies

A4 (3.9), P3 (3.8), C2 (3.7), O3 (3.4), P4 (3.3), A2 (3.1) and P1 (3.1) have lower P/B ratios compared to top performers.

Lowest P/B Ratio Companies

A3 (2.3) shows a very low P/B ratio, followed by O4 (1.7) and M2 (1.3). G1 (1.1). G2 (0.9), M4 (0.9), and G3 (0.7) have the lowest P/B ratios.

- **Tobin's Q (TQ)**

Tobin's Q is a ratio comparing a company's market value to the replacement cost of its assets.

Key Findings

Top Performers in 5-Year Average Tobin's Q

L2 (12.5) leads with the highest 5-year average Tobin's Q., followed by F2 (12), F3 (11.3) and F4 (11.2). F1 (10.3) and O1 (10.6) also exhibit high Tobin's Q ratios.

High Tobin's Q Companies

O5 (7.3), P2 (5.8), and A1 (4.7) exhibit high Tobin's Q, followed by O2 (3.9) and C1 (3.7).

Moderate Tobin's Q Companies

A4 (2.92), L3 (2.82), M1 (2.66), A2 (2.56), P1 (2.12), and P3 (2.10) have moderate Tobin's Q ratios.

Lower Tobin's Q Companies

P4 (1.98), A5 (1.96), A3 (1.45), M3 (1.11), C2 (1.05), O4 (0.99), and M2 (0.95) have lower Tobin's Q ratios compared to top performers.

Lowest Tobin's Q Companies

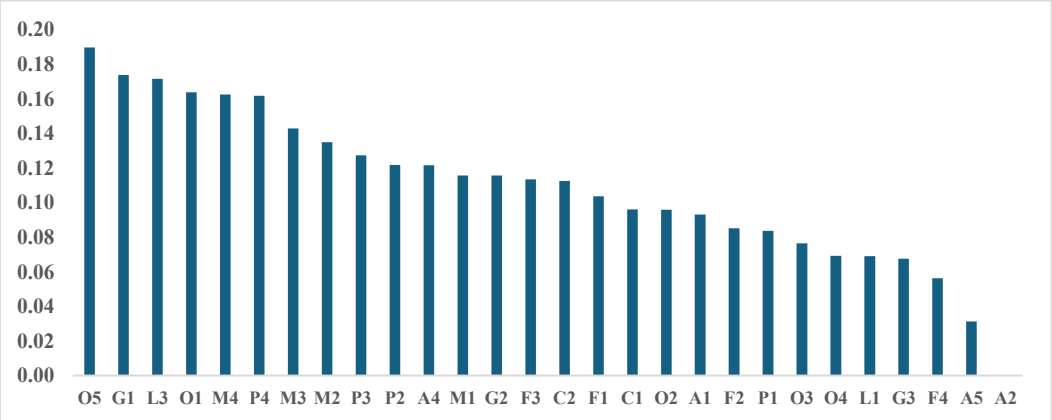
G1 (0.79), O3 (0.71), M4 (0.68), G3 (0.64), and G2 (0.60) have the lowest Tobin's Q of less than 1.

- **Compound Annual Growth Rate of Revenue (REV CAGR)**

The Compound Annual Growth Rate of revenue measures the growth of a company's revenue over a specified period. A higher Compound annual growth rate indicates stronger growth.

Figure 4.19 shows the Average CAGR Revenue data for the 5 years

Figure 4.19. SFP – CAGR Revenue



Key Findings

Top Performers in 5-Year Revenue Compound Annual Growth Rate

L3 (20%) leads with the highest 5-year revenue Compound annual growth rate, followed by G1 (17%) and O5 (17%).

High Revenue Growth Companies

O1 (16%), M4 (16%), and P4 (16%) show a high CAGR of revenue, followed by M3 (14%), L2 (14%), and M2 (13%).

Moderate Revenue Growth Companies

P3 (13%), P2 (12%), and A3 (12%) have moderate revenue growth, followed by M1 (12%) and G2(12%).

Lower Revenue Growth Companies

F3 (11%), C2 (11%), F1 (10%), C1 (10%), O2 (10%), A1 (9%), and F2 (9%) have lower revenue growth compared to the top performers.

Lowest Revenue Growth Companies

P1 (8%), A4 (8%), and O3 (8%) show low revenue growth, followed by O4 (7%), G3 (7%), L1 (7%), and F4 (6%). A2 exhibits insignificant growth, while A5 shows negative growth.

4.6. CESP SFP Relationship Analysis

The relationship analysis explores how Corporate Environmental Sustainability Performance (CESP) variables correlate with Sustained Financial Performance (SFP) variables at the Company level. Table 4.4 shows the CESP and SFP variables across the selected companies.

Comparison of CESP with SFP accounting measures

This analysis correlates the Companies' overall CESP with the accounting-based, market-based, and revenue growth SFP variables.

The independent variable of overall Average CESP (AVE CESP) is measured as the average of the compound annual reduction in emissions intensity (CAGR

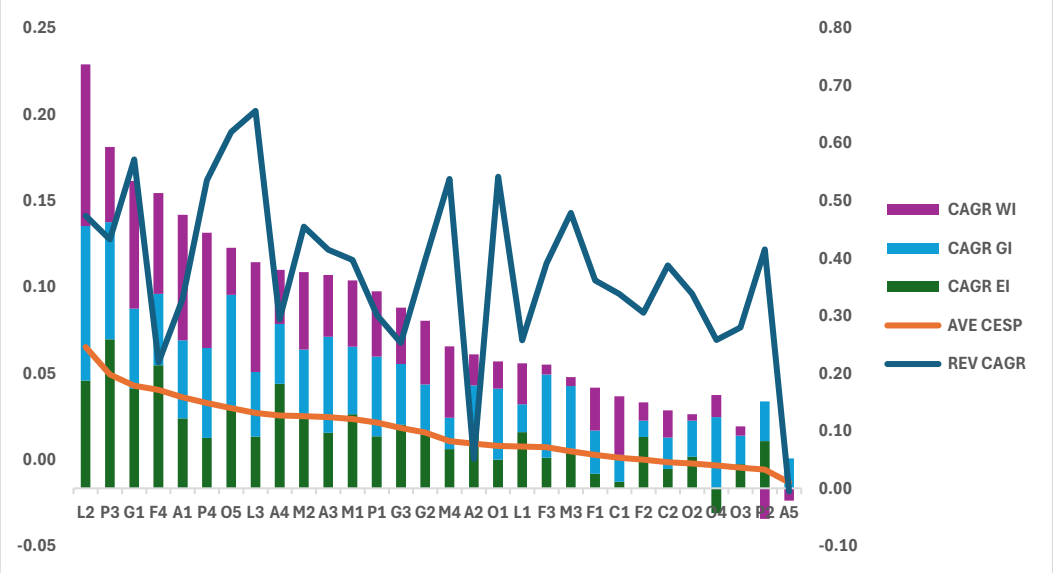
GI), energy consumption intensity (CAGR EI), and water consumption intensity (CAGR WI) as follows:

- *AVE CESP = AVERAGE (CAGR GI+CAGR EI+CAGR WI)*
- *AVE (ROE+ROA) = AVERAGE (ROE AVG +ROA AVG)*

Table 4.4 shows the CESP compared with the SFP measures. Figure 4.20 shows the overall AVE CESP compared with the accounting-based SFP measures of ROE and ROA. Figure 4.21 shows the overall AVE CESP compared with the market-based SFP measures of PB and TQ. Figure 4.22 shows the relationship of CESP with Revenue CAGR.

Figures 4.20 and 4.21 depict the CAGR reductions reversed. For example, the CAGR GI for L2 is -0,27, which means that there is a reduction in GHG Emissions Intensity by 27%. This is shown as 0.27 on the Y-axis. Higher values of AVE CESP show an improvement in CESP performance.

Figure 4.20. CESP -SFP Accounting-based measures

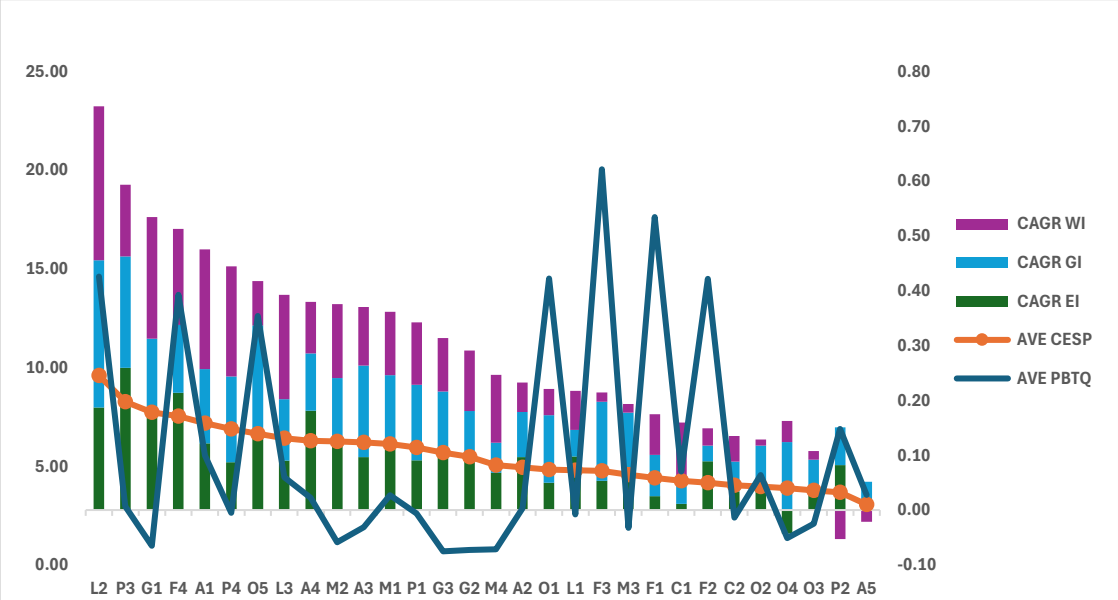


Comparison of CESP and SFP market-based measures

For comparison of CESP performance with market-based measures, the following variables are used

- *AVE CESP = AVERAGE (CAGR GI+CAGR EI+CAGR WI)*
- *VE PBTQ = AVERAGE (PB AVG +TQ AVG)*

Figure 4.21. CESP and SFP market-based measures



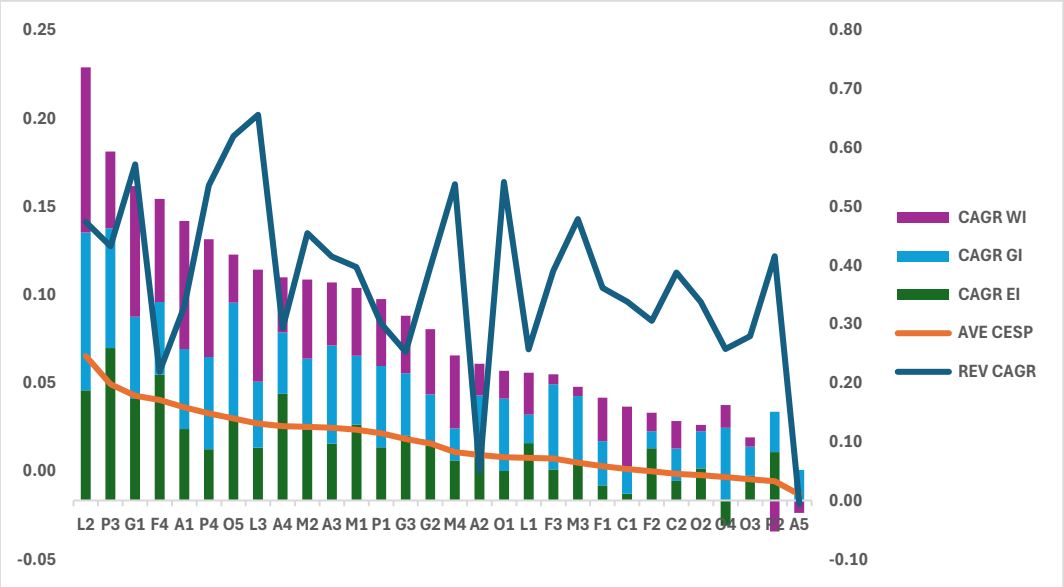
Comparison of CESP and SFP Revenue Growth

For comparison of CESP performance with revenue growth, the following variables are used:

Equation 3.11.

- *AVE CESP = AVERAGE(CAGR GI+CAGR EI+CAGR WI)*
- *REV CAGR*

Figure 4.22. CESP- SFP CAGR Revenue linkage



Key Observations

- L2 shows significant GI, EI, and WI reductions, which correlate with high ROE, ROA, PB, and TQ. L3 shows moderate reductions in GI, EI, and WI, which align with high revenue growth but lower ROA and TQ. L1 displays moderate GI, EI, and WI reductions with low financial returns and moderate revenue growth.
- P3 shows high reductions in GI, EI, and WI with moderate financial performance, which has positive impacts on ROA but less on PB and TQ; P4 shows moderate reductions in GI, EI, and WI, which correlate with revenue growth but not with high returns, indicating mixed results. P1 has moderate GI, EI, and WI reductions with high ROA, whereas P2 has slight reductions in GI and EI with high financial returns.
- G1 has significant reductions in GI, EI, and WI with high ROA and revenue growth, whereas G3 has moderate reductions in GI, EI, and WI with low

financial returns. G2 shows lower GI, EI, and WI reductions with moderate financial returns.

- M1 shows significant reductions in GI, EI, and WI, aligning with ROE, PB, and revenue growth; M2 has high reductions in GI, EI, and WI with low financial returns. M3 has low reductions in GI and EI correlated with moderate financial returns, whereas M4 has moderate reductions in GI with mixed financial returns.
- A3 shows moderate GI, EI, and WI reductions that align with revenue growth but are less than other financial indicators. A1 has very high GI, EI, and WI reductions, which correlate with ROE, ROA, and PB. A4 shows moderate GI, EI, and WI reductions and low to moderate financial returns. A2 shows slight GI, EI, and WI reductions with high ROE and ROA. A5 shows low GI, EI, and WI reductions and negative financial returns.
- O5 has high GI, EI, and WI reductions, which correlate strongly with financial indicators. O4 shows moderate GI reduction with a moderate ROE but low PB and TQ. O1 shows moderate reductions in GI, EI, and WI that correlate with high financial performance; O2 has moderate reductions in GI, EI, and WI with high ROE and ROA. O3 has slight GI, EI, and WI reductions with moderate financial performance.
- F3 exhibits high GI reductions but low reductions in EI and WI, with very high financial performance on accounting and market-based measures but low revenue growth. F4 shows significant GI, EI, and WI reductions with high ROE and ROA. F1 has slight reductions in GI, EI, and WI with high financial returns. F2 has slight reductions in GI, EI, and WI, which correlate with high financial performance.

- C2 and C1 show slight GI, EI, and WI reductions with moderate financial returns.

4.7. Company Percentile Rankings Analysis

The comparison analyses companies' percentile ranks based on their Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) variables.

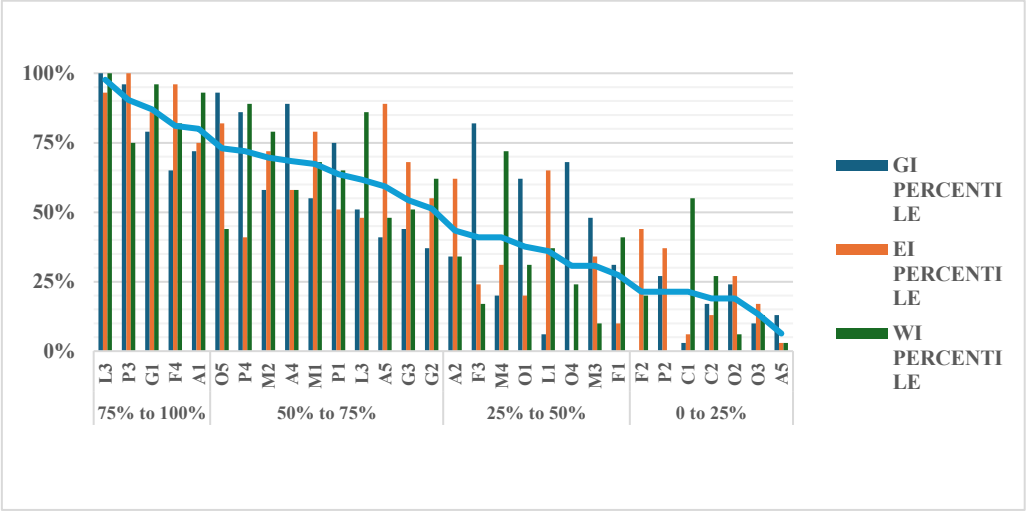
CESP Percentile rankings

The CESP variables have been assigned percentile ranges based on the percentile rank calculation within each CESP variable, CAGR GI, CAGR EI, and CAGR WI. The overall AVE CESP PERCENTILE rank is calculated as the average CAGR GI percentile, CAGR EI percentile, and CAGR WI percentile. This analysis helps to understand the relative ranking of the Company as compared to other companies in terms of compound average annual reduction in the GHG Emissions Intensity, Energy consumption Intensity, and Water consumption Intensity. The companies have been assigned to one of the four percentile ranges based on the overall CESP percentile rank as follows:

- 75% to 100% - highest percentile range
- 50% to 75% - Medium percentile range
- 25% to 50% - Low percentile range
- 0 to 25% - Lowest percentile range

Table 4.5 shows the calculation of the CESP percentiles and the CESP percentile ranks. Figure 4.23 shows the classification of companies in the respective percentile range for CESP:

Figure 4.23. CESP percentile Range

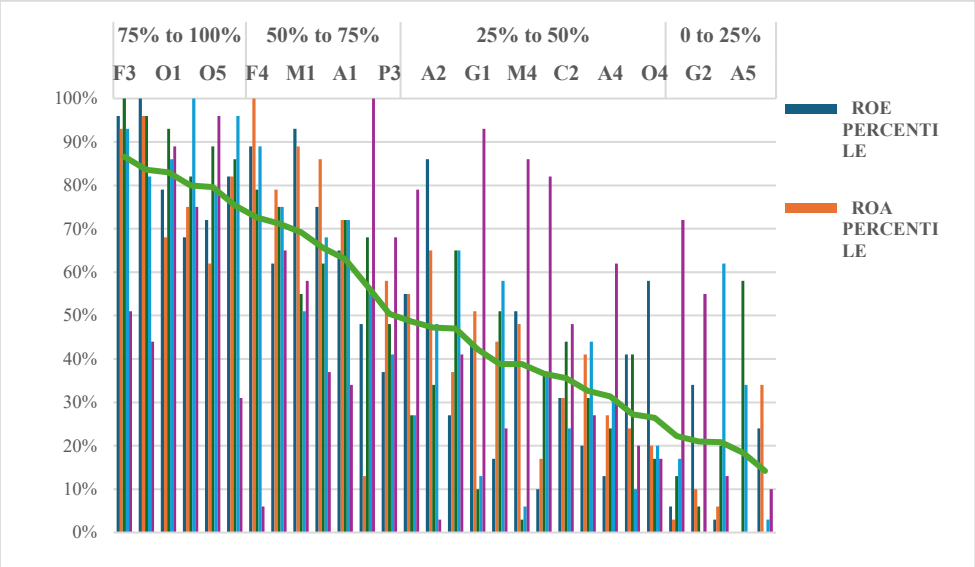


SFP Percentile rankings

The SFP variables have been assigned a percentile range based on the percentile rank calculation within the respective column. The overall SFP percentile (AVE SFP) is calculated as the average of the ROE AVG, ROA AVG, PB AVG, TQ, AVG, and REVENUE CAGR percentiles. The company has been assigned to one of the four percentile ranges based on the overall SFP percentile (AVE SFP).

Table 4.6 shows the SFP percentiles and the SFP percentile rank. Figure 4.24 shows the classification of companies in the respective percentile range for SFP:

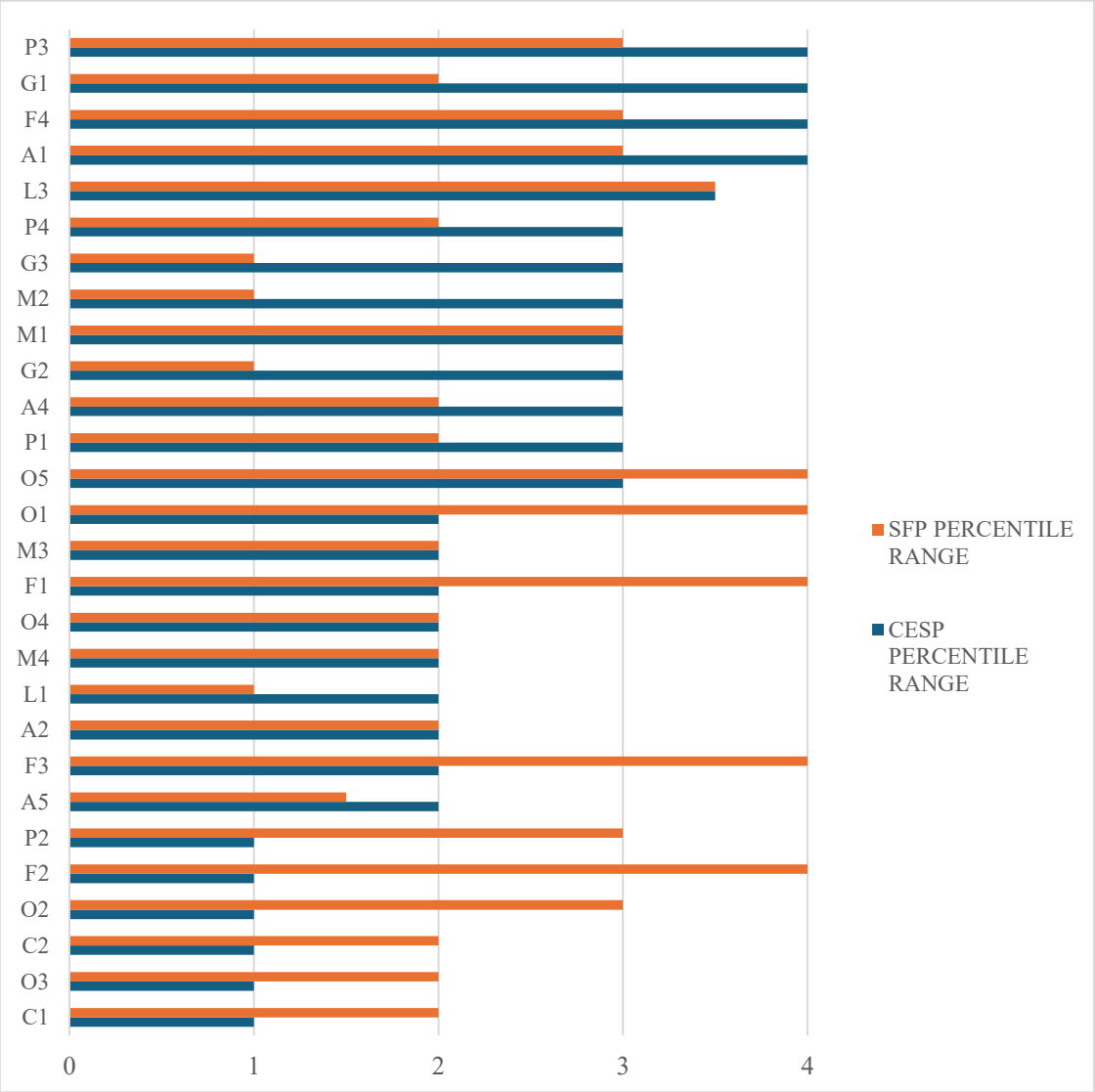
Figure 4.24. SFP Percentile Rankings



Comparison of CESP and SFP Percentile range

Figure 4.25 shows the comparison of the overall CESP percentile range and the respective SFP percentile range:

Figure 4.25. CESP SFP Percentile Comparison



CESP PERCENTILE RANGE and SFP PERCENTILE RANGE correspond to the X-axis values in the above chart as follows:

- *Rank 4-Percentile 75% to 100%*
- *Rank 3-Percentile 50% to 75%*
- *Rank 2-Percentile 25% to 50%*
- *Rank 1-Percentile 0 to 25%*

Key observations

- High CESP and High SFP or Higher relative SFP: G1 (Oil & Gas), L2, A1 , F4, O5, and M1
- High performance in CESP and Moderate-low relative SFP. P3 , P4
- Moderate-High CESP and SFP: P1, G2, G3, L3, A3, A4, M2
- Moderate-Low CESP and High SFP: Divis , O1, A2, F3, F1, O2, F2
- Low CESP and SFP: C1, O4, O3 , A5

4.8. Sectoral Performance Analysis

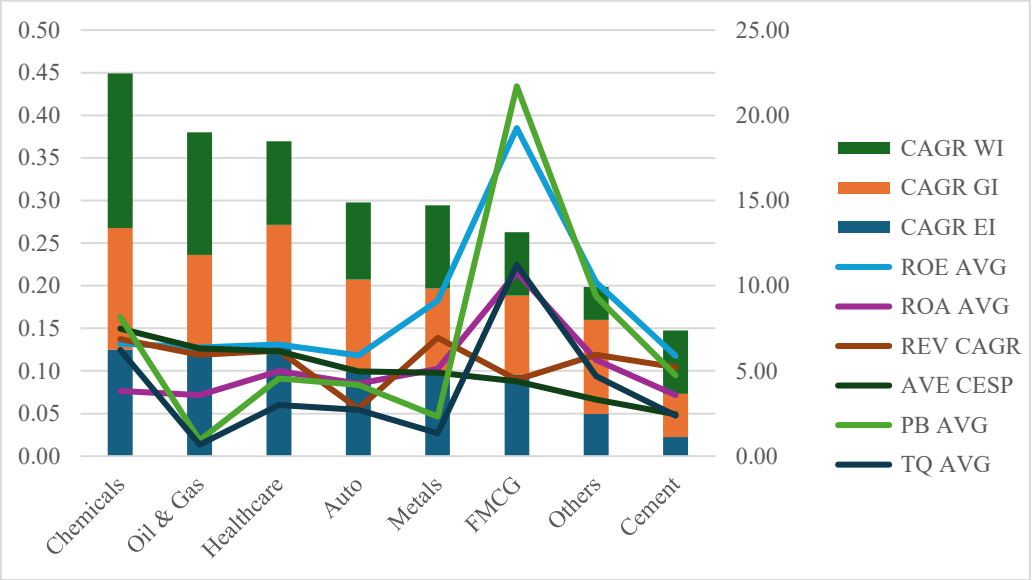
The sector-specific analysis compares the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) based on the company's performance relative to the sectoral level performance.

Overall Sectoral Performance

The sectoral performance analysis helps understand how each sector performs in terms of the overall average; both CESP (environmental sustainability) and SFP (financial sustainability) are analysed at the sector level and compared with the overall averages across all sectors.

Tables 4.8 and 4.9 show the sectoral CESP and SFP data for high environmental impact and low environmental impact sectors. Figure 4.26 shows the overall sectoral average CESP variables CAGR GI, CAGR EI, and CAGR WI, as well as the sectoral averages of the SFP accounting-based measures AVE(ROE+ROA) and the SFP market-based measures AVE PBTQ.

Figure 4.26. Sectoral CESP SFP comparison



Key Observations

- The Chemicals sector shows a high average reduction in CESP, with GI (14%), EI (12%), and WI (18%), aligning with average Return on Equity - ROE (13%) and high Price to Book - PB (8.17). The sector has a high revenue growth REV CAGR (14%) and a high overall average of CESP.
- The Oil & Gas sector exhibits an average reduction in GI (11%), EI (13%), and WI (14%), which correlates with moderate financial metrics such as ROE (13%) and ROA (7%). The market-based SFP metrics are very low, with PB (0.93) and TQ (0.68). The revenue growth is average with REV CAGR (12%).
- The Healthcare sector shows high reductions in EI (14%) and GI (13%), with a lower reduction in WI (10%). The sector has an average ROE (13%) and ROA (10%), a relatively high PB (4.56) and TQ (2.99), and a moderate average REV CAGR (12%), with an above-average CESP score.

- The Metals sector reports moderate reductions in GI (10%), EI (10%), and WI (10%), with a high ROE (18%), REVCAGR (14%) and ROA (10%). The sector's average PB ratio and TQ correspond with the sector's average CESP.
- The Auto sector displays moderate reductions in CESP metrics, with GI (11%), EI (10%), and WI (9%). Financial performance indicators are moderate, such as ROE (12%) and ROA (9%), PB ratio (4.18), and TQ (2.71), with poor revenue growth REVCAGR (6%).
- The FMCG sector shows lower reductions in GI (9%), EI (10%), and WI (7%) and has the highest average ROE (39%) and ROA (22%). The sector's PB ratio (21.70) and TQ (11.22) are significantly higher than other sectors, with a low REVCAGR (9%). The sector has below-average CESP (9%).
- The Others category, which includes diversified sectors like construction and consumer durables, shows overall average reductions in GI (11%), low reductions in EI (5%), and WI (4%). The financial performance indicators are strong, with a strong ROE (20%) and ROA (11%) and high PB (9.36) and TQ (4.68) ratios. The REVCAGR (10%) indicates low revenue growth.
- The Cement sector shows the slightest reduction in GI (5%), EI (2%), and WI (7%), with low financial returns as seen in ROE (11.76) and ROA (7.18). The sector's PB ratio (4.75) and TQ (2.38) are moderate, with a low REVCAGR (10%) and the sector's poor overall CESP.

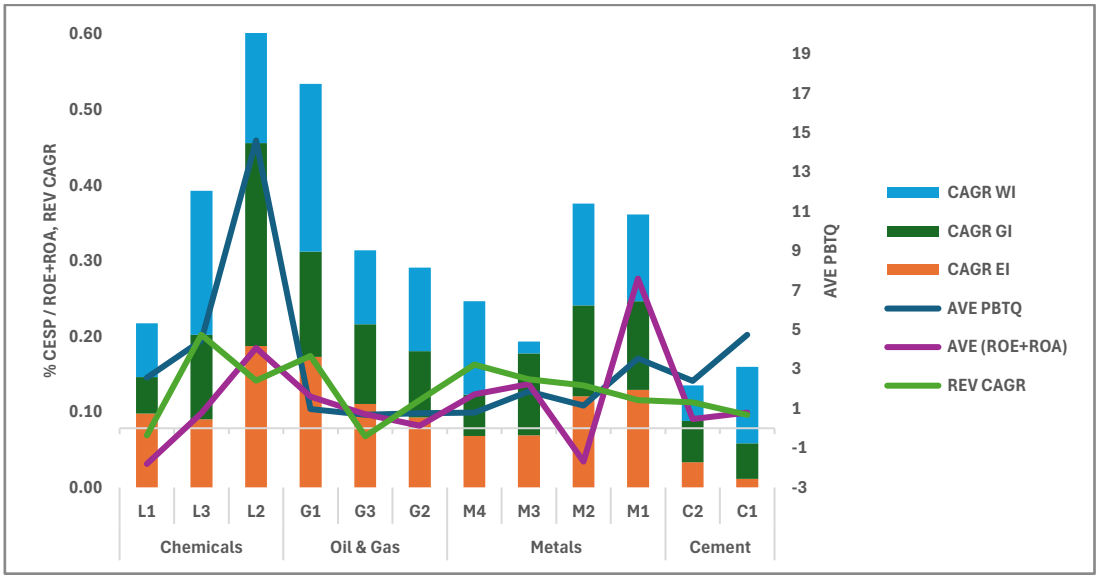
Company analysis within the sectoral categories

This analysis focuses on the company's performance categorised under the respective industry sectors. Companies are grouped into High and Low-environmental impact categories to understand the CESP-SFP linkages within

these categories. For this analysis, the positive scores for CESP indicate improvements, that is, reductions in the CAGR GI, CAGR EI, and CAGR WI.

Figure 4.27 shows a snapshot of the sector-wise company-level CESP and SFP performance for the High Environmental Impact sector companies.

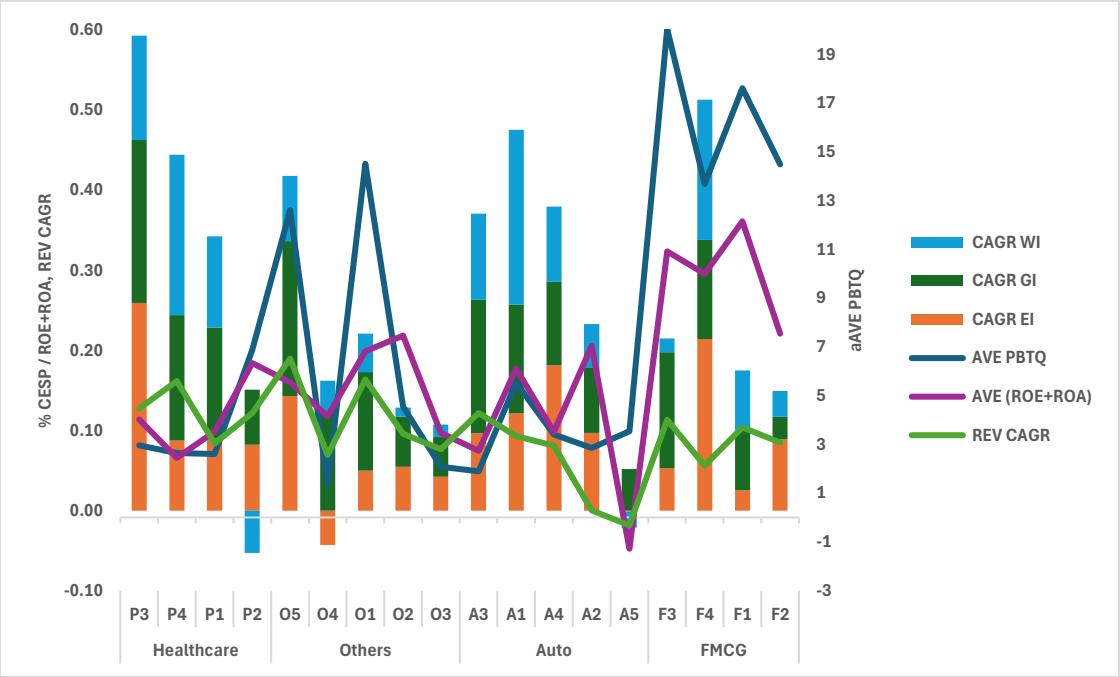
Figure 4.27. High environmental impact companies, sector-wise, CESP SFP



Low environmental impact sectors

Figure 4.28 shows a snapshot of the sector-wise company-level CESP and SFP performance for the Low Environmental Impact sector companies.

Figure 4.28. Low Environmental Impact Companies: CESP SFP by Sector

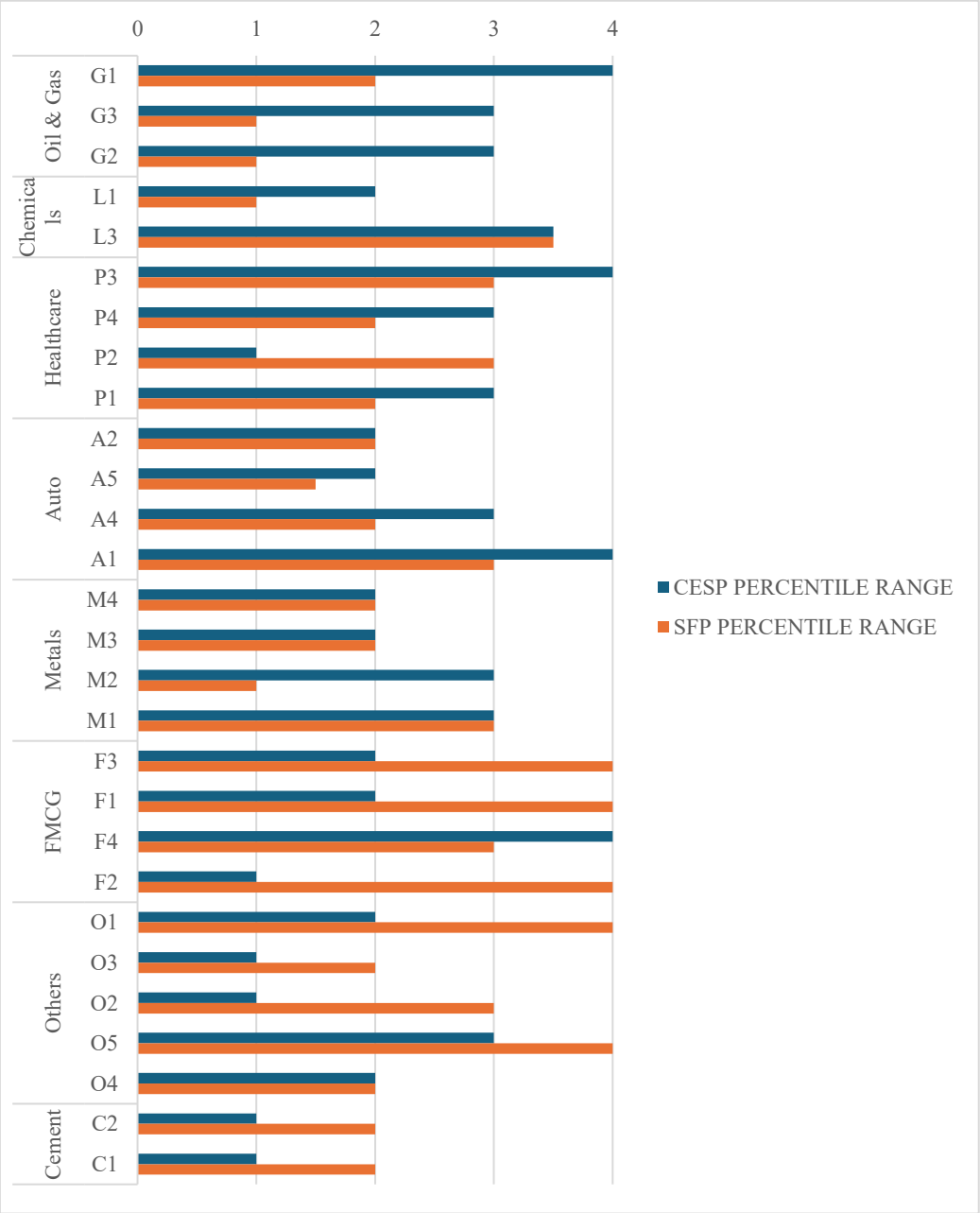


4.9. Sectoral CESP SFP percentiles

Figure 4.29 compares the CESP (Corporate Environmental, Social, and Governance Performance) percentile rank with the SFP (Sustained Financial Performance) percentile across the companies categorised by sector. The analysis is based on percentile performance divided into four categories. The sectoral percentile CESP and SFP data are given in Table 4.10.

- High Percentile (75% to 100%) - Rank 4
- Moderate-High Percentile (50% to 75%) - Rank 3
- Moderate-Low Percentile (25% to 50%) - Rank 2
- Low Percentile (0% to 25%) - Rank 1

Figure 4.29. CESP SFP Sectoral Percentile Comparison



Key observations:

- High CESP and High SFP or Higher relative SFP: G1 (Oil & Gas), L2, A1, F4, O5, and M1
- High performance in CESP and Moderate relative SFP. Dir. P3 , P4
- Moderate-High CESP and SFP: P1, L3 (Chemicals), M & M, A4, M2
- Moderate-Low CESP and High SFP: P2s , O1, A2, F3, F1, O2, F2.

- Moderate-Low CESP and SFP: G3, G2, M4, C1, O4, O3 , A5

4.10. Company Relative Performance Analysis

This analysis compares each company's performance relative to the sector average, normalised to a value of 1.

Table 4.11 and Table 4.12 show the relative value for each variable of CESP and SFP compared to the corresponding average score. For CESP variables, the actual Company CESP value is compared to the overall average for high or low-environmental-impact sectors, whichever is applicable. The Company's SFP value is compared to the sector average for SFP. The base values are taken as 1. This helps map all the variables above and below the average CEP and SFP scores.

The formula is calculated as follows:

Company CESP relative value = CESP value / CESP average for HEI / LEI sectors

Company relative SFP value = SFP value / SFP average for the sector

For example,

CAGR EI L2 = 0,19

CAGR average for High environmental impact sectors = 0.10

The corresponding value for CAGR EI for L2 = 1/0.10 x 0.19 =1.9.

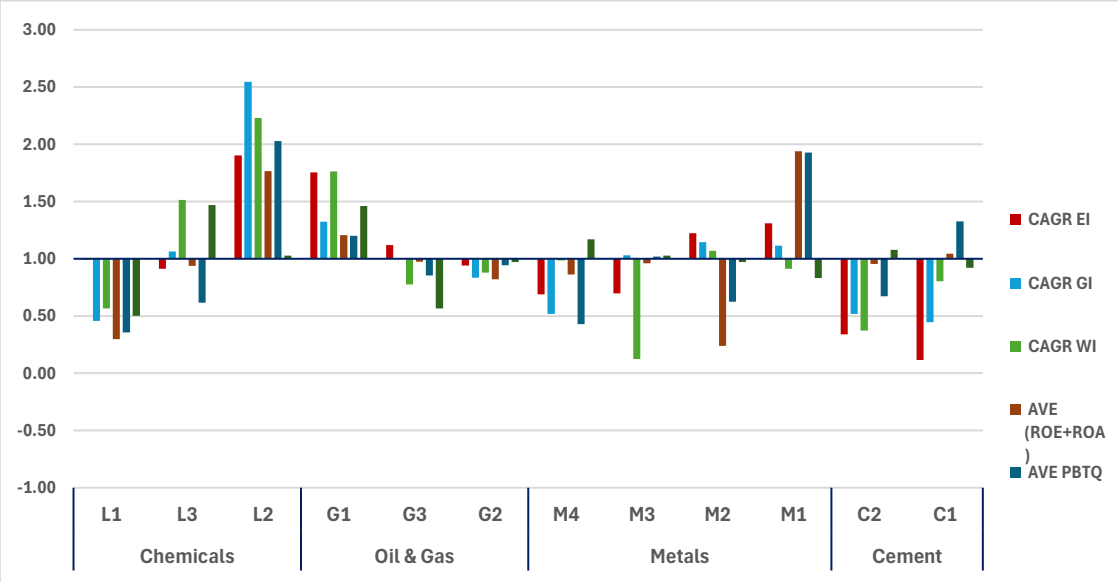
This means that L2 is 90% above the HEI average for a reduction in GHG emissions.

High Environmental Impact Sectors

CESP SFP Relative Performance High Environmental Impact Sectors

The analysis of Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) across high environmental impact sectors (Chemicals, Oil & Gas, Metals, and Cement) provides insights into how companies perform relative to their sector averages.

Figure 4.30 shows the normalised CESP and SFP scores for the Chemicals, Oil and Gas, Metals, and Cement sectors and their relative performance to the sector average. Figure 4.30. High environmental impact sectors - CESP SFP relative performance



Key observations

- **Chemicals Sector:**

L2 shows significant outperformance in CESP metrics, with CAGR EI at 1.90, CAGR GI at 2.55, and CAGR WI at 2.23 compared to the high environmental impact sector average of 1.0. Financial performance metrics are also strong, with

ROE & ROA at 1.77 and PBTQ at 2.03, above the Chemicals sector averages. However, the revenue CAGR is slightly above the sector average at 1.03. L3's performance is mixed, with moderate reductions in EI (0.91), GI (1.06), and a high score in WI (1.51). The company's financial metrics are around average, except for high revenue growth (1.47), but lower in ROE & ROA (0.94) and PBTQ (0.62). L1 performs with an average score in EI (0.99) but low scores in GI (0.46) and WI (0.57). Financial performance is weak, with ROE and ROA at 0.30 and PBTQ at 0.36, well below sector averages. Revenue growth is low at 0.50.

- **Oil & Gas Sector:**

G1 shows significantly above the high environmental impact sectoral averages in sustainability performance, with EI at 1.75, GI at 1.33, and WI at 1.76. Financial metrics are well above the Oil & Gas sector average, with ROE & ROA at 1.21, PBTQ at 1.20, and strong revenue growth at 1.46. G3 shows average performance in EI (1.12) and GI (1.00) but lower WI (0.78). Financial performance is moderate, with ROE & ROA at 0.97 and PBTQ at 0.85. Revenue growth is slower than the sector average. G2 shows below-average performance across CESP with EI (0.94), GI (0.83), and WI (0.88). Financial performance is also moderate, with ROE & ROA at 0.82, PBTQ at 0.94, and revenue growth at 0.97.

- **Metals Sector:**

M1 scores above average among the high environmental impact sectors in CESP metrics, with EI at 1.31 and GI at 1.11, with around average WI at 0.91. Financial performance is exceptional relative to the Metals sector averages, with ROE &

ROA at 1.94 and PBTQ at 1.93. Revenue growth remains moderate at 0.83. M2 shows above-average performance in EI (1.22), GI (1.14), and WI (1.07). Financial performance, however, is weak, please with ROE & ROA at 0.24 and PBTQ at 0.62. Revenue growth is average, with the sector at 0.97. M3 shows high performance in GI (1.03) but lags in WI (0.12) and EI (0.70). Financial performance is average, with ROE & ROA at 0.96 and high PBTQ at 1.02. Revenue growth remains average at 1.03. M4 shows low CESP metrics, with EI at 0.69, GI at 0.52, and WI at 0.98. Financial performance is below average, with ROE and ROA at 0.86 and PBTQ at 0.43. Revenue growth is high at 1.17.

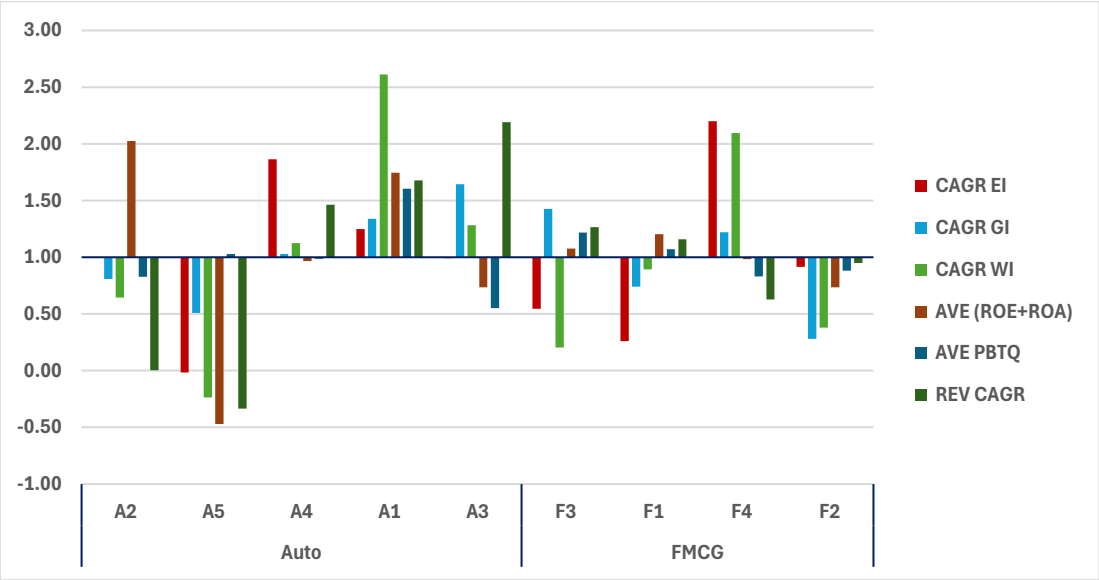
- **Cement Sector:**

C1 shows poor performance on CESP compared to the high environmental impact sectors, with EI at 0.12, GI at 0.45, and WI at 0.80. Financial performance is moderate, with ROE & ROA at 1.04 and a higher PBTQ at 1.33. Revenue growth remains below average at 0.92. C2 shows weak CESP performance, with EI at 0.34, GI at 0.52, and WI at 0.37. Financial performance is moderate, with ROE & ROA at 0.96 and low PBTQ at 0.67. Revenue growth is slightly above average at 1.08.

Low Environmental Impact Sectors

Figure 4.31 and Figure 4.32 show the normalised CESP and SFP scores for the low environmental impact sectors and their relative performance to the sector average.

Figure 4.31. Auto and FMCG – CESP SFP relative performance



Key observations

- **Auto Sector**

A1 outperforms the sector average across CESP and SFP metrics. It shows higher values in CAGR EI (1.33), CAGR GI (1.20), and CAGR WI (2.93). Financial performance is strong, with above-average ROE & ROA (1.75) and PBTQ (1.61) and solid revenue growth at 1.68. A2 shows moderate performance in CESP metrics, with CAGR EI (1.06), GI (0.73), and WI (0.73). However, it shows a high ROE & ROA (2.02) and below-average PBTQ (0.83), but revenue growth remains stagnant at 0.00.

A3 displays average EI performance, with outperformance in GI (1.48) and WI (1.26). Financial metrics are below the sector average, with ROE & ROA (0.73) and PBTQ (0.55). However, the company shows strong revenue growth at 2.19.

A4 performs well in CAGR EI (1.99) and WI (1.44) but shows average performance in GI (0.92). Financial metrics like ROE (0.97) and TQ (0.99) are near the sector average, with high revenue growth at 1.46.

A5 underperforms across all metrics, with negative growth in CAGR EI (-0.02) and WI (-0.27). Financial performance is also weak, with a negative ROE (-0.47) but an average PBTQ (1.03). Revenue growth is negative at -0.33.

- **FMCG Sector**

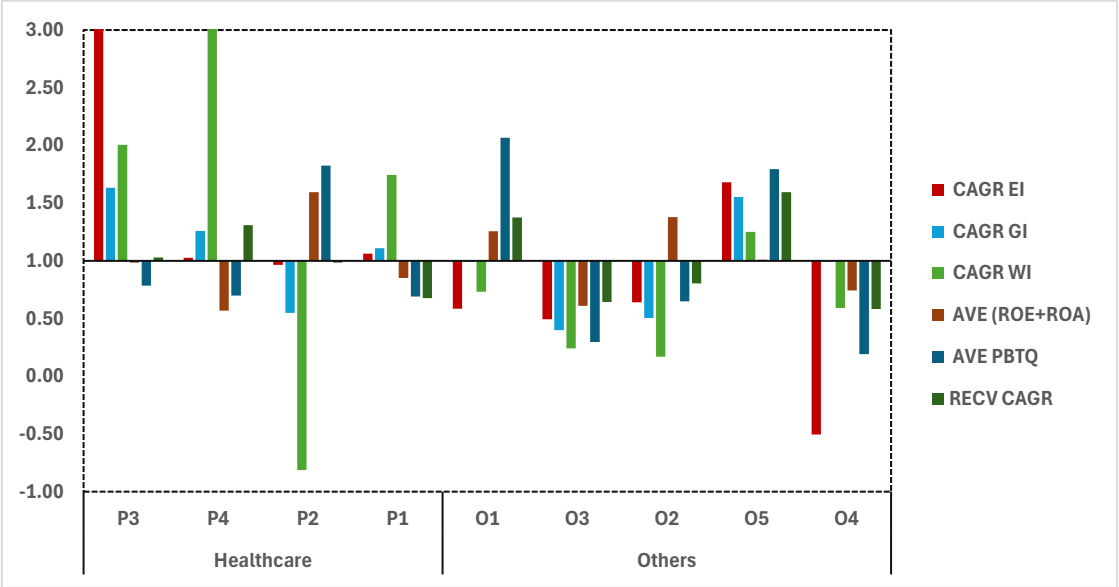
F4 significantly outperforms the sector averages in CESP metrics, with exceptionally high CAGR EI (2.35) and WI (2.36). However, financial performance is moderate, with ROE & ROA (0.98) and PBTQ (0.83). Revenue growth is below the sector average at 0.63.

F3 shows higher performance in GI reduction (1.28) but low performance in EI (0.58) and WI (0.23). Financial performance is strong, with ROE & ROA (1.08) and PBTQ (1.22), with above-average revenue growth at 1.27.

F1 performs below average in most environmental metrics but maintains strong financial performance, with ROE & ROA (1.20) and above-average PBTQ (1.07). Revenue growth is healthy at 1.16.

F2 lags in CESP and SFP metrics, particularly in WI (0.42). However, financial metrics are below average, with ROE & ROA (0.74) and PBTQ (0.88). Revenue growth is slightly below average at 0.95.

Figure 4.32. Healthcare & Others – Relative Performance



- **Healthcare Sector**

P1 delivers average to high performance across CESP metrics, with CAGR EI (0.99), GI (1.22), and WI (1.50). Financial returns are below average, with ROE & ROA (0.85) and PBTQ (0.69). Revenue growth is low at 0.68.

P2 exhibits weak environmental performance, particularly with negative growth in WI (-0.70). However, financial performance is strong, with above-average ROE & ROA (1.59) and PBTQ (1.82). Revenue growth is average at 0.98.

P3 shows a mixed performance, excelling in EI (2.84), GI (1.80), and WI (1.73). Financial metrics are average, with ROE & ROA (0.99) and low PBTQ (0.78). Revenue growth is moderate at 1.03.

P4 delivers good performance in environmental metrics, with a high WI (2.65). Financial performance is below average, with lower ROE & ROA (0.57) and PBTQ (0.70), but strong revenue growth at 1.31.

- **Other Sectors**

O1 underperforms across CESP, with moderate EI (0.55) and average GI (1.O5) but strong financial performance, with a high PBTQ (2.07) and solid revenue growth at 1.38.

O2 shows mixed performance, with moderate to low CESP metrics (EI = 0.60, GI = 0.56, WI = 0.15) but strong financial returns, with ROE & ROA (1.38), but low PBTQ (0.65). Revenue growth remains below average at 0.81.

O3 underperforms in most metrics, with lower EI (0.46) and GI (0.44) values. Financial metrics are weak, with ROE & ROA (0.61) and PBTQ (0.30). Revenue growth is below average at 0.64.

O4 shows weak CESP performance, particularly in EI (-0.47). Financial metrics are below average, with ROE & ROA (0.74) and PBTQ (0.19). Revenue growth remains low at 0.58.

O5 shows above-average CESP and SFP metrics, with high EI (1.57), GI (1.71), and WI (1.1). Financial performance is strong, with ROE & ROA (1.01) and PBTQ (1.80), with strong revenue growth at 1.59.

4.11. Sectoral Rankings and Analysis

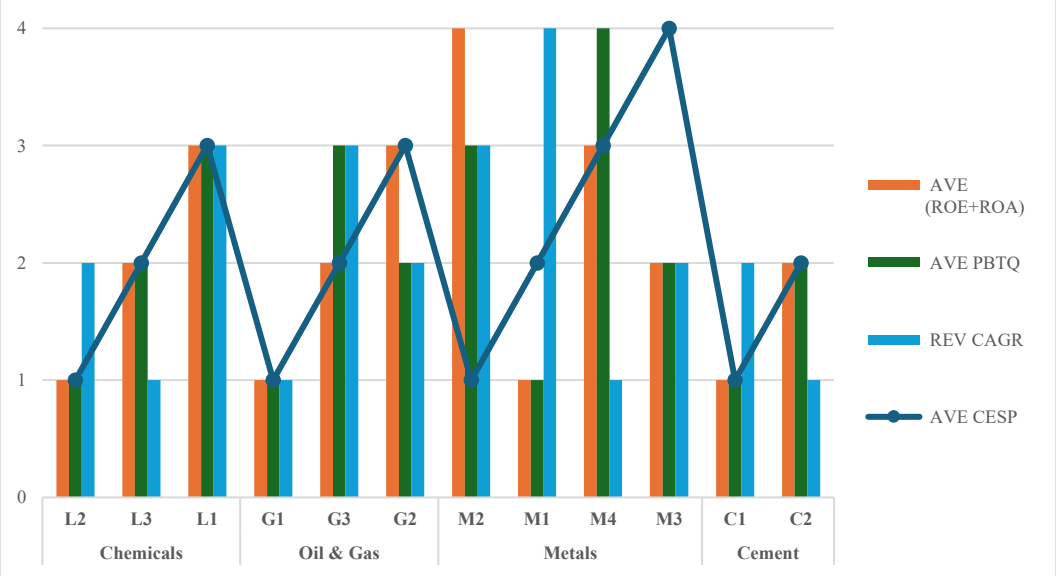
The following analysis examines the rankings of companies within high environmental impact sectors (Chemicals, Oil & Gas, Metals, and Cement) based on key performance indicators: Compound Annual Growth Rate of Revenue (REV CAGR), Return on Equity, & Return on Assets (AVE (ROE+ROA)), Price-to-Book (PB) and Tobin's Q (AVE (PBTQ)) and Overall Corporate Environmental Sustainability Performance (AVE CESP). The rankings are

provided on a scale where one represents the highest (best) rank, and higher numbers indicate lower performance. This analysis ranks the companies within the sectors based on their CESP and SFP performance.

High Environmental Impact Sectors

Figure 4.33 shows the sectoral rankings for the CESP and SFP scores for the Chemicals, Oil and gas, Metals, and Cement sectors. The sectoral rankings data are given in Table 4.13.

Figure 4.33. CESP SFP sectoral ranking: High environmental impact sectors



Key observations

Chemicals sector

- L2 has the highest ranking in CESP. It also has the highest ranking in SFP variables, except for Revenue growth.

Rankings: REVCAGR (2), ROE+ROA (1), PBTQ (1), CESP (1)

- L3: *Rankings: REVCAGR (1), ROE+ROA (2), PBTQ (2), CESP (2)*
- L1 ranks the lowest in all categories within the Chemicals sector. *Rankings: REVCAGR (3), ROE+ROA (3), PBTQ (3), CESP (3)*

Oil & Gas Sector

- G1 has the highest ranking in CSEP and SFP: Rankings: REVCAGR (1), ROE+ROA (1), PBTQ (1), CESP (1)
- G3: REVCAGR (3), ROE+ROA (2), PBTQ (3), CESP (2)
- G2: Rankings: REVCAGR (2), ROE+ROA (3), PBTQ (2), CESP (3)

Metals Sector

- M1 has the highest rankings in SFP except for revenue.

  Rankings: REVCAGR (4), ROE+ROA (1), PBTQ (1), CESP (2)

- M2: Rankings: REVCAGR (3), ROE+ROA (4), PBTQ (3), CESP (1)
- M3: REVCAGR (2), ROE+ROA (2), PBTQ (2), CESP (4)
- M4: REVCAGR (1), ROE+ROA (3), PBTQ (4), CESP (3)

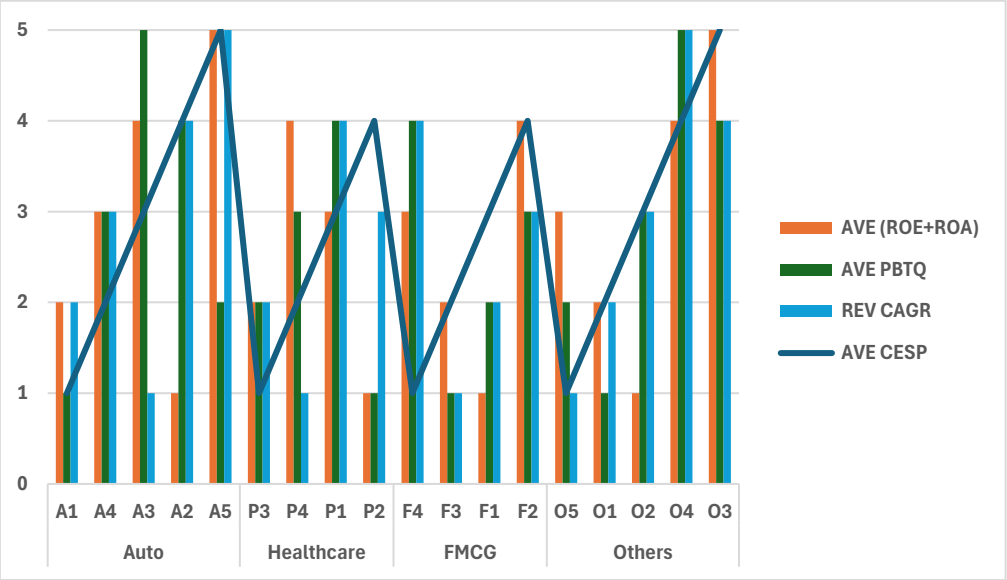
Cement Sector

- C1: REVCAGR (2), ROE+ROA (1), PBTQ (1), CESP (1)
- C2: REVCAGR (1), ROE+ROA (2), PBTQ (2), CESP (2)

Low Environmental Impact Sectors

Figure 4.34 shows the sectoral rankings for the CESP and SFP scores for the low environmental impact sectors. The sectoral rankings data are given in Table 4.14.

Figure 4.34. CESP SFP sectoral ranking - low environmental impact sectors



4.12. Sectoral Leadership

The findings from the percentile analysis, sectoral averages, and sectoral rankings were consolidated to ascertain the leaders and laggards in CESP and SFP.

The percentile ranges were divided into four categories based on overall CESP :

- 75% to 100%: High performance (Leaders)
- 25% to 50% or 50% to 75%, and the highest sectoral performance (Leaders)
- 25% to 50% or 50% to 75% and > 15% above average sectoral performance (Mid-Performers)
- 0% to 25% or around average or below average sectoral performance, Low performance (Laggards)

SFP categorisation:

- Leaders: Companies with an overall percentile score of 75% to 100% or 50% to 75% and significantly above the sector average.
- Mid-Performers: Companies with scores around the sector average (within 10% of the average).
- Laggards: Companies with 0 to 25% range scores and below the sector average.

Figure 4.35 was created to visualise companies' CESP and SFP performance within each sector. The chart used colour coding to distinguish between leaders, mid-performers, and laggards.

Figure 4.35. Sectoral leadership

Company	Industry	CESP Leadership	SFP Leadership
L2	Chemicals	LEADER	LEADER
L3	Chemicals	MID PERFORMER	MID PERFORMER
L1	Chemicals	LAGGARD	LAGGARD
P3	Healthcare	LEADER	MID PERFORMER
P4	Healthcare	MID PERFORMER	MIDPERFORMER
P1	Healthcare	MID PERFORMER	MIDPERFORMER
P2	Healthcare	LAGGARD	LEADER
G1	Oil & Gas	LEADER	LEADER
G3	Oil & Gas	MID PERFORMER	LAGGARD
G2	Oil & Gas	MID PERFORMER	LAGGARD
M1	Metals	LEADER	LEADER
M2	Metals	LEADER	LAGGARD
M3	Metals	LAGGARD	MID PERFORMER
M4	Metals	LAGGARD	LAGGARD
A1	Auto	LEADER	LEADER
A3	Auto	MID PERFORMER	MID PERFORMER
A4	Auto	MID PERFORMER	MID PERFORMER
A2	Auto	LAGGARD	MID PERFORMER
A5	Auto	LAGGARD	LAGGARD
F4	FMCG	LEADER	MID PERFORMER
F1	FMCG	LAGGARD	LEADER
F3	FMCG	MID PERFORMER	LEADER
F2	FMCG	LAGGARD	MID PERFORMER
O5	Others	LEADER	LEADER
O1	Others	MID PERFORMER	LEADER
O2	Others	MID PERFORMER	MID PERFORMER
O3	Others	LAGGARD	LAGGARD
O4	Others	LAGGARD	LAGGARD
C1	Cement	LAGGARD	MID PERFORMER
C2	Cement	LAGGARD	MID PERFORMER

4.13. Analysis and Research Findings

1. **Chemicals Sector:**

   - Leader:

     L2 displayed outperformance, with CESP and SFP percentile scores in the top percentile range and significantly above the sector average, categorising it as a leader in both CESP and SFP.

   - Mid-Performer:

     L3 is classified as a mid-performer in both CESP and SFP, with CESP and SFP slightly above the sector average.

   - Laggard:

     L1 is a low performer in CESP and SFP.

2. **Oil & Gas Sector:**

   - Leader:

     G1 was a leader with a top percentile ranking in CESP and SFP, exceeding sector averages.

   - Mid-Performer & Laggard:

     G3 was categorised as a mid-performer in CESP with scores around the sector average and a low performer in SFP. G2 displayed mid-performance in CESP and below the sector averages in SFP.

3. **Healthcare Sector:**

   - Leader:

     P3 excelled with high CESP but was a mid-performer in SFP compared to the high performance of P2.

   - Mid-Performer:

P4 showed high CESP performance, with lower-than-average SFP. P1 was classified as a mid-performer due to CESP and SFP scores around the sector average.

- Laggard / Leader:

  P2, with CESP significantly below the sector average, was classified as a sectoral leader in SFP

4. **Metals Sector:**

   - Leader:

     M1 was a leader, with its CESP and SFP scores well above the sector average.

   - Mid-Performer / Laggard:

     M3 showed below-average performance in CESP, making it a laggard in CESP and a mid-performer in SFP. M2 was a CESP leader with a very high CESP but an SFP laggard with a very low SFP.

   - Laggard:

     M4 showed below-average CESP and SFP scores.

5. **Auto Sector:**

   - Leader:

     A1 was a leader, with outperformance in both CESP and SFP, above the sector average.

   - Mid-Performers:

     A4 and A3 were considered mid-performers, with near-sector-average scores.

   - Laggards:

A2 shows low CESP, with mid-performance in SFP. A5 scored poorly in CESP and SFP and was identified as a laggard.

6. **FMCG Sector:**

- Leader: / Mid-Performer

  F4 led the sector, with outperformance in CESP, though SFP scores showed mid-performance due to the exceptionally high SFP of F3 and F1.

- Mid-Performer / Leader:

  F3, with moderate CESP and exceptional SFP, was classified as a mid-performer in CESP and a leader in SFP.

- Laggard / Leader:

  F1, with below-average CESP and exceptional SFP, was classified as an SFP leader and CESP laggard.

- Laggard / Mid performer

  F2 was identified as a laggard due to its relatively lower CESP and SFP below sector averages.

7. **Others Sector:**

- Leader:

  O5 was a leader in this sector, with high percentile scores in both CESP and SFP.

- Mid-Performer / Leader:

  O1 and O2 were categorised as mid-performers in CESP, showing average to moderate CESP performance. O1 showed outperformance in SFP and was categorised as an SFP leader, whereas O2 was a mid-performer in SFP.

- Laggards:

  O4 and O3 were considered laggards with low scores in both CESP and SFP.

8. **Cement Sector:**

   Both C2 and C1 were laggards, with CESP in the last percentile and SFP scores around the sector averages.

4.14. Statistical Analysis

The statistical results on hypothesis testing are derived from SPSS and include correlation analysis, non-parametric group comparisons, and ordinal logistic regression models, with sectoral segmentation where relevant.

H1: There is a positive association between Corporate Environmental Sustainability Performance (CESP) and Sustained Finance al Performance (SFP).

The relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) was tested using Spearman Rank-Order Correlation, as both variables were ordinally ranked.

The results show a moderate positive and statistically significant correlation ($\rho = 0.388$, $p = 0.034$, $N = 30$). This indicates that firms with stronger sustainability performance (lower environmental intensity) tend to achieve better financial performance (higher ROE, ROA, PB ratio, revenue growth, and Tobin's Q). Thus, H1 is supported.

Test Used: Spearman Rank-Order Correlation

Spearman's $\rho = 0.388$

p = 0.034 (significant at 0.05 level)

N = 30

H2: Companies in the high CESP group show significantly higher financial performance than those in the low CESP group.

A Mann–Whitney U test was conducted to compare SFP ranks between high- and low-CESP groups. The results indicate a statistically significant difference in financial performance ranks:

High-CESP (Leaders) (N = 8) had a mean rank of 10.44

Low-CESP (Laggards) (N = 22) had a mean rank of 17.34 (U = 47.5, Z = –2.032, p = 0.042).

As lower SFP ranks represent better financial outcomes, these findings confirm that high-CESP firms consistently outperform low-CESP firms in financial performance. H2 is therefore supported**.**

H3: CESP is a significant predictor of SFP, and the predictive strength varies by sector.

The predictive strength of CESP on SFP was examined using Ordinal Logistic Regression (OLR), with SFP rank as the dependent variable and CESP rank as the independent variable. Subgroup analyses were conducted for high and low environmental impact sectors.

H3a: Overall Model (All Sectors Combined)

The overall OLR model was marginally non-significant (Model χ^2 = 5.509, p = 0.064, Nagelkerke R^2 = 0.190). However, parameter estimates showed that low CESP performers had significantly lower odds of being in a higher SFP category than high-CESP leaders (β = –2.170, p = 0.023).

Thus, while the model explains a modest proportion of variance, the direction of the relationship supports the theoretical expectation that better CESP predicts better SFP. H3 is partially supported in the overall sample.

H3b: High Environmental Impact Sectors

In high-impact sectors (SECGROUP = 1), the model was statistically significant (Model χ^2 = 4.749, p = 0.029, Nagelkerke R^2 = 0.370). The parameter estimate confirmed that low CESP performers were significantly less likely to achieve higher financial performance (β = –3.045, p = 0.042).

This suggests that environmental sustainability has strong financial relevance in high-impact sectors, strongly supporting H3.

H3c: Low Environmental Impact Sectors

In low-impact sectors (SECGROUP = 2), the model was not statistically significant (Model $\chi^2 = 1.130$, $p = 0.288$, Nagelkerke $R^2 = 0.070$; $\beta = -1.142$, $p = 0.309$).

This indicates that CESP has no significant predictive power for financial performance in low-impact sectors, confirming the hypothesised sectoral variation within H3.

The following table shows a summary of the hypothesis analysis and results:

Summary of Hypotheses Results

Hypothesis	Test Used	Key Result	Supported
H1	Spearman Correlation	ρ = 0.388, p =0.034	Yes
H2	Mann–Whitney U	U = 47.5, p = 0.042; High CESP > Low CESP	Yes
H3a	OLR (Overall)	Significant in the full model and high-EI sectors only	Partially Supported (Sector-dependent)
H3b	OLR (high impact)	Significant predictive relationship in high-impact sectors (p = 0.029)	Yes
H3c	OLR (low impact)	No significant predictive relationship in low-impact sectors (p = 0.288)	No

4.15. Appendix of Tables

Table 4.1. High and Low Environmental Impact Companies

High Environmental Impact (HEI)	Low Environmental Impact (LEI)

• Cement
  ○ C1,C2
• Metals
  ○ M1,M2,M3,M4
• Oil & Gas
  ○ G1,G2,G3
• Chemicals
  ○ L1,L2,L3
	• Healthcare
	  ○ P1,P2,P3,P4
	• Auto
	  ○ A1,A2,A3,A4,A5
	• FMCG
	  ○ F1,F2,F3,F4
	• Others
	  ○ O1,O2,O3,O4,O5

Table 4.2. CESP Absolute and Intensity Performance

Company	CAGR_GE	CAGR_GI	CAGR EC	CAGR EI	CAGR WC	CAGR WI
L2	-0.17	-0.27	-0.07	-0.19	-0.18	-0.28
P3	-0.10	-0.20	-0.16	-0.26	-0.02	-0.13
O5	-0.04	-0.19	0.02	-0.14	0.09	-0.08
A3	-0.07	-0.17	0.01	-0.10	0.00	-0.11
P4	-0.02	-0.16	0.03	-0.09	-0.07	-0.20
F3	-0.05	-0.14	0.05	-0.05	0.04	-0.02
G1	0.01	-0.14	-0.03	-0.17	-0.09	-0.22
P1	-0.07	-0.14	-0.01	-0.09	-0.05	-0.11
A1	-0.06	-0.14	-0.04	-0.12	-0.15	-0.22
O4	-0.06	-0.12	0.12	0.04	0.24	-0.04
F4	-0.07	-0.12	-0.17	-0.21	-0.13	-0.18
O1	0.02	-0.12	0.11	-0.05	0.11	-0.05
M2	0.00	-0.12	0.00	-0.12	-0.02	-0.13
M1	-0.02	-0.12	-0.03	-0.13	-0.01	-0.12
L3	0.07	-0.11	0.09	-0.09	-0.03	-0.19
M3	0.02	-0.11	0.06	-0.07	0.12	-0.02
G3	-0.05	-0.11	-0.05	-0.11	-0.04	-0.10
A4	-0.03	-0.10	-0.11	-0.18	-0.02	-0.09
G2	0.02	-0.09	0.01	-0.09	-0.01	-0.11
A2	-0.08	-0.08	-0.10	-0.10	-0.05	-0.05
F1	0.02	-0.08	0.08	-0.03	0.02	-0.07
P2	0.04	-0.07	0.03	-0.08	0.18	0.05
O2	0.03	-0.06	0.04	-0.05	0.08	-0.01
M4	0.10	-0.05	0.08	-0.07	0.02	-0.12
C2	0.05	-0.05	0.08	-0.03	0.06	-0.05
A5	-0.07	-0.05	-0.02	0.00	0.00	0.02
O3	0.02	-0.05	0.03	-0.04	0.06	-0.02
L1	0.02	-0.05	-0.04	-0.10	-0.01	-0.07
C1	0.04	-0.05	0.08	-0.01	-0.02	-0.10
F2	0.05	-0.03	-0.01	-0.09	0.05	-0.03
Average	-0.01	-0.11	0.00	-0.09	0.01	-0.10

Table 4.3. SFP performance

Company	ROE AVE	ROA AVE	PB AVE	TQ AVE	REVCAGR
O1	0.24	0.15	18.47	10.56	0.16
F1	0.50	0.22	24.93	10.31	0.10
P1	0.11	0.08	3.10	2.12	0.08
F2	0.26	0.18	16.97	12.01	0.09
P2	0.20	0.17	8.00	5.77	0.12
P3	0.13	0.10	3.83	2.10	0.13
A1	0.20	0.15	6.40	4.67	0.09
G1	0.15	0.10	1.14	0.79	0.17
L1	0.04	0.03	1.79	3.33	0.07
A2	0.26	0.15	3.15	2.56	0.00
M2	0.04	0.02	1.34	0.95	0.13
F3	0.43	0.21	28.77	11.32	0.11
M1	0.35	0.20	4.42	2.66	0.12
G2	0.12	0.04	0.91	0.60	0.12
O2	0.24	0.20	5.24	3.86	0.10
M3	0.18	0.10	2.86	1.11	0.14
O3	0.14	0.06	3.46	0.71	0.08
A3	0.09	0.06	2.35	1.45	0.12
F4	0.35	0.24	16.14	11.23	0.06
A4	0.11	0.08	3.89	2.92	0.08
G3	0.12	0.08	0.73	0.64	0.07
L2	0.21	0.16	16.67	12.55	0.14
O4	0.18	0.05	1.71	0.99	0.07
C1	0.12	0.08	5.76	3.71	0.10
P4	0.09	0.05	3.30	1.98	0.16
A5	-0.08	-0.02	5.13	1.96	-0.02
M4	0.16	0.09	0.90	0.68	0.16
O5	0.21	0.11	17.91	7.30	0.19
C2	0.12	0.06	3.74	1.05	0.11
L3	0.15	0.04	6.07	2.82	0.20
Average	0.18	0.11	7.29	4.16	0.11

Table 4.4. CESP-SFP relationship

Company	CAGR GI	CAGR EI	CAGR WI	ROE AVG	ROA AVG	PB AVG	TQ AVG	REV CAGR
P3	-0.20	-0.26	-0.13	0.13	0.10	3.83	2.10	0.13
M1	-0.12	-0.13	-0.12	0.35	0.20	4.42	2.66	0.12
L2	-0.27	-0.19	-0.28	0.21	0.16	16.67	12.55	0.14
F4	-0.12	-0.21	-0.18	0.35	0.24	16.14	11.23	0.06
O5	-0.19	-0.14	-0.08	0.21	0.11	17.91	7.30	0.19
O1	-0.12	-0.05	-0.05	0.24	0.15	18.47	10.56	0.16
F3	-0.14	-0.05	-0.02	0.43	0.21	28.77	11.32	0.11
F1	-0.08	-0.03	-0.07	0.50	0.22	24.93	10.31	0.10
P1	-0.14	-0.09	-0.11	0.11	0.08	3.10	2.12	0.08
F2	-0.03	-0.09	-0.03	0.26	0.18	16.97	12.01	0.09
P2	-0.07	-0.08	0.05	0.20	0.17	8.00	5.77	0.12
A1	-0.14	-0.12	-0.22	0.20	0.15	6.40	4.67	0.09
G1	-0.14	-0.17	-0.22	0.15	0.10	1.14	0.79	0.17
L3	-0.11	-0.09	-0.19	0.15	0.04	6.07	2.82	0.20
L1	-0.05	-0.10	-0.07	0.04	0.03	1.79	3.33	0.07
A2	-0.08	-0.10	-0.05	0.26	0.15	3.15	2.56	0.00
G2	-0.09	-0.09	-0.11	0.12	0.04	0.91	0.60	0.12
O2	-0.06	-0.05	-0.01	0.24	0.20	5.24	3.86	0.10
M3	-0.11	-0.07	-0.02	0.18	0.10	2.86	1.11	0.14
M2	-0.12	-0.12	-0.13	0.04	0.02	1.34	0.95	0.13
O3	-0.05	-0.04	-0.02	0.14	0.06	3.46	0.71	0.08
A3	-0.17	-0.10	-0.11	0.09	0.06	2.35	1.45	0.12
A4	-0.10	-0.18	-0.09	0.11	0.08	3.89	2.92	0.08
G3	-0.11	-0.11	-0.10	0.12	0.08	0.73	0.64	0.07
O4	-0.12	0.04	-0.04	0.18	0.05	1.71	0.99	0.07
C1	-0.05	-0.01	-0.10	0.12	0.08	5.76	3.71	0.10
P4	-0.16	-0.09	-0.20	0.09	0.05	3.30	1.98	0.16
A5	-0.05	0.00	0.02	-0.08	-0.02	5.13	1.96	-0.02
M4	-0.05	-0.07	-0.12	0.16	0.09	0.90	0.68	0.16
C2	-0.05	-0.03	-0.05	0.12	0.06	3.74	1.05	0.11
Average	-0.11	-0.09	-0.10	0.18	0.11	7.29	4.16	0.11

Table 4.5 CESP Percentile Ranking

	COMPANY	GI PERCENTILE	EI PERCENTILE	WI PERCENTILE	CESP TOTAL PERCENTILE
75% to 100%					
	L2	100.0%	93.0%	100.0%	97.7%
	P3	96.0%	100.0%	75.0%	90.3%
	G1	79.0%	86.0%	96.0%	87.0%
	F4	65.0%	96.0%	82.0%	81.0%
	A1	72.0%	75.0%	93.0%	80.0%
50% to 75%					
	O5	93.0%	82.0%	44.0%	73.0%
	P4	86.0%	41.0%	89.0%	72.0%
	M2	58.0%	72.0%	79.0%	69.7%
	A3	89.0%	58.0%	58.0%	68.3%
	M1	55.0%	79.0%	68.0%	67.3%
	P1	75.0%	51.0%	65.0%	63.7%
	L3	51.0%	48.0%	86.0%	61.7%
	A4	41.0%	89.0%	48.0%	59.3%
	G3	44.0%	68.0%	51.0%	54.3%
	G2	37.0%	55.0%	62.0%	51.3%
25% to 50%					
	A2	34.0%	62.0%	34.0%	43.3%
	M4	20.0%	31.0%	72.0%	41.0%
	F3	82.0%	24.0%	17.0%	41.0%
	O1	62.0%	20.0%	31.0%	37.7%
	L1	6.0%	65.0%	37.0%	36.0%
	O4	68.0%	0.0%	24.0%	30.7%
	M3	48.0%	34.0%	10.0%	30.7%
	F1	31.0%	10.0%	41.0%	27.3%
0 to 25%					
	C1	3.0%	6.0%	55.0%	21.3%
	F2	0.0%	44.0%	20.0%	21.3%
	P2	27.0%	37.0%	0.0%	21.3%
	C2	17.0%	13.0%	27.0%	19.0%
	O2	24.0%	27.0%	6.0%	19.0%
	O3	10.0%	17.0%	13.0%	13.3%
	A5	13.0%	3.0%	3.0%	6.3%

Table 4.6. SFP Percentile Rankings

Company	ROE PERCENTILE	ROA PERCENTILE	PB PERCENTILE	TQ PERCENTILE	REV PERCENTILE	SFP TOTAL PERCENTILE
75% to 100%						
F3	96.0%	93.0%	100.0%	93.0%	51.0%	86.6%
F1	100.0%	96.0%	96.0%	82.0%	44.0%	83.6%
O1	79.0%	68.0%	93.0%	86.0%	89.0%	83.0%
L2	68.0%	75.0%	82.0%	100.0%	75.0%	80.0%
O5	72.0%	62.0%	89.0%	79.0%	96.0%	79.6%
F2	82.0%	82.0%	86.0%	96.0%	31.0%	75.4%
50% to 75%						
F4	89.0%	100.0%	79.0%	89.0%	6.0%	72.6%
P2	62.0%	79.0%	75.0%	75.0%	65.0%	71.2%
M1	93.0%	89.0%	55.0%	51.0%	58.0%	69.2%
O2	75.0%	86.0%	62.0%	68.0%	37.0%	65.6%
A1	65.0%	72.0%	72.0%	72.0%	34.0%	63.0%
L3	48.0%	13.0%	68.0%	55.0%	100.0%	56.8%
P3	37.0%	58.0%	48.0%	41.0%	68.0%	50.4%
25% to 50%						
M3	55.0%	55.0%	27.0%	27.0%	79.0%	48.6%
A2	86.0%	65.0%	34.0%	48.0%	3.0%	47.2%
C1	27.0%	37.0%	65.0%	65.0%	41.0%	47.0%
G1	44.0%	51.0%	10.0%	13.0%	93.0%	42.2%
A4	17.0%	44.0%	51.0%	58.0%	24.0%	38.8%
M4	51.0%	48.0%	3.0%	6.0%	86.0%	38.8%
P4	10.0%	17.0%	37.0%	37.0%	82.0%	36.6%
C2	31.0%	31.0%	44.0%	24.0%	48.0%	35.6%
P1	20.0%	41.0%	31.0%	44.0%	27.0%	32.6%
A3	13.0%	27.0%	24.0%	31.0%	62.0%	31.4%
O3	41.0%	24.0%	41.0%	10.0%	20.0%	27.2%
O4	58.0%	20.0%	17.0%	20.0%	17.0%	26.4%
0 to 25%						
M2	6.0%	3.0%	13.0%	17.0%	72.0%	22.2%
G2	34.0%	10.0%	6.0%	0.0%	55.0%	21.0%
L1	3.0%	6.0%	20.0%	62.0%	13.0%	20.8%
A5	0.0%	0.0%	58.0%	34.0%	0.0%	18.4%
G3	24.0%	34.0%	0.0%	3.0%	10.0%	14.2%

Table 4.7. Average Sectoral Performance on CESP and SFP

Industry	CAGR EI	CAGR GI	CAGR WI	ROE AVE	ROA AVE	PB AVE	TQ AVE	REV CAGR	AVE CESP
Chemicals	0.12	0.14	0.18	0.13	0.08	8.17	6.23	0.14	0.15
Oil & Gas	0.13	0.11	0.14	0.13	0.07	0.93	0.68	0.12	0.13
Healthcare	0.13	0.14	0.10	0.13	0.10	4.56	2.99	0.12	0.12
Auto	0.10	0.11	0.09	0.12	0.09	4.18	2.71	0.06	0.10
Metals	0.10	0.10	0.10	0.18	0.10	2.32	1.34	0.14	0.10
FMCG	0.10	0.09	0.07	0.39	0.22	21.70	11.22	0.09	0.09
Others	0.05	0.11	0.04	0.20	0.11	9.36	4.68	0.12	0.07
Cement	0.02	0.05	0.07	0.12	0.07	4.75	2.38	0.10	0.05
Overall Average	0.09	0.11	0.10	0.18	0.11	7.29	4.16	0.11	0.10

Table 4.8. CESP – SFP High Environmental Impact Sectors

Company	CAGR EI	CAGR GI	CAGR WI	AVE ROE+ROA	AVE PBTQ	REV CAGR
Chemicals	0.12	0.14	0.18	0.10	7.20	0.14
L2	0.19	0.27	0.28	0.18	14.61	0.14
L3	0.09	0.11	0.19	0.10	4.44	0.20
L1	0.10	0.05	0.07	0.03	2.56	0.07
Oil & Gas	0.13	0.11	0.14	0.10	0.80	0.12
G1	0.17	0.14	0.22	0.12	0.96	0.17
G3	0.11	0.11	0.10	0.10	0.69	0.07
G2	0.09	0.09	0.11	0.08	0.76	0.12
Metals	0.10	0.10	0.10	0.14	1.83	0.14
M1	0.13	0.12	0.12	0.28	3.54	0.12
M2	0.12	0.12	0.13	0.03	1.15	0.13
M3	0.07	0.11	0.02	0.14	1.87	0.14
M4	0.07	0.05	0.12	0.12	0.79	0.16
Cement	0.02	0.05	0.07	0.09	3.57	0.10
C1	0.01	0.05	0.10	0.10	4.74	0.10
C2	0.03	0.05	0.05	0.09	2.40	0.11
Average	0.10	0.11	0.13	0.11	3.21	0.13

Table 4.9. CESP – SFP Low environmental impact sectors

Company	CAGR EI	CAGR GI	CAGR WI	AVE ROE+ROA	AVE PBTQ	REV CAGR
Healthcare	0.13	0.14	0.10	0.12	3.77	0.12
P3	0.26	0.20	0.13	0.11	2.96	0.13
P4	0.09	0.16	0.20	0.07	2.64	0.16
P1	0.09	0.14	0.11	0.10	2.61	0.08
P2	0.08	0.07	-0.05	0.18	6.88	0.12
Others	0.05	0.11	0.04	0.16	7.02	0.12
O5	0.14	0.19	0.08	0.16	12.61	0.19
O1	0.05	0.12	0.05	0.20	14.52	0.16
O2	0.05	0.06	0.01	0.22	4.55	0.10
O3	0.04	0.05	0.02	0.10	2.08	0.08
O4	-0.04	0.12	0.04	0.12	1.35	0.07
Auto	0.10	0.11	0.09	0.10	3.45	0.06
A1	0.12	0.14	0.22	0.18	5.53	0.09
A3	0.10	0.17	0.11	0.07	1.90	0.12
A4	0.18	0.10	0.09	0.10	3.40	0.08
A2	0.10	0.08	0.05	0.21	2.86	0.00
A5	0.00	0.05	-0.02	-0.05	3.54	-0.02
FMCG	0.10	0.09	0.07	0.30	16.46	0.09
F4	0.21	0.12	0.18	0.30	13.68	0.06
F3	0.05	0.14	0.02	0.32	20.04	0.11
F1	0.03	0.08	0.07	0.36	17.62	0.10
F2	0.09	0.03	0.03	0.22	14.49	0.09
Average	0.09	0.11	0.07	0.16	7.40	0.10

Table 4.10. CESP SFP Sector-wise percentiles

P1	CESP PERCENTILE RANGE	SFP PERCENTILE RANGE
Oil & Gas		
G1	4	2
G2	3	1
G3	3	1
Healthcare		
P3	4	2
P4	3	2
P1	3	2
P2	1	3
Chemicals		
L2	4	4
L3	3	3
L1	2	1
Auto		
A1	4	3
A3	3	2
A4	3	2
A2	2	2
A5	1	1
Metals		
M1	3	3
M2	3	1
M3	2	3
M4	2	2
FMCG		
F4	4	3
F1	2	4
F3	2	4
F2	1	4
Others		
O5	3	4
O1	2	4
O4	2	2
O2	1	3
O3	1	2
Cement		
C1	1	2
C2	1	2

Table 4.11. High Environmental Impact sectors - CESP SFP relative performance

Company	CAGR EI	CAGR GI	CAGR WI	AVE (ROE+ROA)	AVE PBTQ	REV CAGR
Chemicals	**1.27**	**1.36**	**1.44**	**1.00**	**1.00**	**1.00**
L2	1.90	2.55	2.23	1.77	2.03	1.03
L3	0.91	1.06	1.51	0.94	0.62	1.47
L1	0.99	0.46	0.57	0.30	0.36	0.50
Oil & Gas	**1.27**	**1.05**	**1.14**	**1.00**	**1.00**	**1.00**
G1	1.75	1.33	1.76	1.21	1.20	1.46
G3	1.12	1.00	0.78	0.97	0.85	0.57
G2	0.94	0.83	0.88	0.82	0.94	0.97
Metals	**0.98**	**0.95**	**0.77**	**1.00**	**1.00**	**1.00**
M1	1.31	1.11	0.91	1.94	1.93	0.83
M2	1.22	1.14	1.07	0.24	0.62	0.97
M3	0.70	1.03	0.12	0.96	1.02	1.03
M4	0.69	0.52	0.98	0.86	0.43	1.17
Cement	**0.23**	**0.48**	**0.59**	**1.00**	**1.00**	**1.00**
C1	0.12	0.45	0.80	1.04	1.33	0.92
C2	0.34	0.52	0.37	0.96	0.67	1.08
Grand Total	**1.00**	**1.00**	**1.00**			

Table 4.12. Low Environmental Impact sectors - CESP SFP relative performance

Company	CAGR EI	CAGR GI	CAGR WI	AVE (ROE+ROA)	AVE PBTQ	REV CAGR
Healthcare	1.42	1.25	1.29	1.00	1.00	1.00
P1	0.99	1.22	1.50	0.85	0.69	0.68
P2	0.90	0.61	-0.70	1.59	1.82	0.98
P3	2.84	1.80	1.73	0.99	0.78	1.03
P4	0.96	1.39	2.65	0.57	0.70	1.31
Others	0.54	0.98	**0.52**	1.00	1.00	1.00
O1	0.55	1.09	0.64	1.26	2.07	1.38
O2	0.60	0.56	0.15	1.38	0.65	0.81
O3	0.46	0.44	0.21	0.61	0.30	0.64
O4	-0.47	1.10	0.52	0.74	0.19	0.58
O5	1.57	1.71	1.10	1.01	1.80	1.59
Auto	1.08	0.96	**1.22**	1.00	1.00	1.00
A1	1.33	1.20	2.93	1.75	1.61	1.68
A4	1.99	0.92	1.26	0.97	0.99	1.46
A3	1.06	1.48	1.44	0.73	0.55	2.19
A2	1.06	0.73	0.73	2.02	0.83	0.00
A5	-0.02	0.46	-0.27	-0.47	1.03	-0.33
FMCG	1.05	0.82	1.00	1.00	1.00	1.00
F4	2.35	1.10	2.36	0.98	0.83	0.63
F3	0.58	1.28	0.23	1.08	1.22	1.27
F1	0.28	0.67	0.99	1.20	1.07	1.16
F2	0.98	0.25	0.42	0.74	0.88	0.95
Average	1.00	1.00	1.00			

Table 4.13 CESP SFP sectoral ranking – high environmental impact sectors

Company	AVE CESP	AVE (ROE+ROA)	AVE PBTQ	REV CAGR
Chemicals				
L2	1	1	1	2
L3	2	2	2	1
L1	3	3	3	3
Oil & Gas				
G1	1	1	1	1
G3	2	2	3	3
G2	3	3	2	2
Metals				
M2	1	4	3	3
M1	2	1	1	4
M4	3	3	4	1
M3	4	2	2	2
Cement				
C1	1	1	1	2
C2	2	2	2	1

Table 4.14. CESP SFP sectoral ranking - low environmental impact sectors

Company	AVE CESP	AVE (ROE+ROA)	AVE PBTQ	REV CAGR
Auto				
A1	1	2	1	2
A4	2	3	3	3
A3	3	4	5	1
A2	4	1	4	4
A5	5	5	2	5
Healthcare				
P3	1	2	2	2
P4	2	4	3	1
P1	3	3	4	4
P2	4	1	1	3
FMCG				
F4	1	3	4	4
F3	2	2	1	1
F1	3	1	2	2
F2	4	4	3	3
Others				
O5	1	3	2	1
O1	2	2	1	2
O2	3	1	3	3
O4	4	4	5	5
O3	5	5	4	4

Table 4.15: Hypothesis Results

Hypothesis	Test Used	Results	Interpretation
H1: There is a positive association between CESP and SFP.	Spearman Rank-Order Correlation	$\rho = 0.388$, $p = 0.034$, $N = 30$	A moderate positive and statistically significant correlation exists. Companies with stronger CESP tend to have better financial performance. Supports H1.
H2: Companies in the high CESP group show significantly higher financial performance than those in the low CESP group.	Mann–Whitney U Test	$U = 47.5$, $Z = –2.032$, $p = 0.042$; $N1 = 8$ (High CESP Leaders, Mean Rank = 10.44); $N2 = 22$ (Low CESP Laggards, Mean Rank = 17.34)	Statistically significant difference in SFP ranks. High CESP firms consistently outperform low CESP firms. Supports H2.
H3a: CESP is a significant predictor of SFP (all sectors combined).	Ordinal Logistic Regression (pooled)	Model $\chi^2 = 5.509$, $p = 0.064$; Nagelkerke $R^2 = 0.190$; β (CESP 1 vs 3) = –2.170, $p = 0.023$; β (CESP 2 vs 3) = not significant	The overall model is marginally non-significant, but low CESP firms have significantly lower odds of higher SFP than high CESP leaders—partial support for H3.
H3b: CESP is a significant predictor of SFP in high environmental impact sectors.	Ordinal Logistic Regression (SECGROUP = 1)	Model $\chi^2 = 4.749$, $p = 0.029$; Nagelkerke $R^2 = 0.370$; β (CESP 1 vs 3) = –3.045, $p = 0.042$	Significant predictive relationship; high CESP firms in high-impact sectors have much higher odds of better SFP. Strongly supports H3.
H3c: CESP is a significant predictor of SFP in low environmental impact sectors.	Ordinal Logistic Regression (SECGROUP = 2)	Model $\chi^2 = 1.130$, $p = 0.288$; Nagelkerke $R^2 = 0.070$; β (CESP 1 vs 3) = –1.142, $p = 0.309$	No statistically significant relationship found; predictive strength is negligible in low-impact sectors. Does not support H3 in low-impact sectors.

Table 4.16: SPSS Output Extracts

1 Spearman Correlation (H1)

Pair	Spearman's ρ	Sig. (2-tailed)	N
CESP Rank ↔ SFP Rank	0.388	0.034	30

2 Mann–Whitney U Test (H2)

Group	*N*	*Mean Rank*	*Sum of Ranks*
High CESP (Leader)	8	10.44	83.5
Low CESP (Laggard)	22	17.34	381.5

Test Statistic	Value
Mann–Whitney U	47.5
Z	–2.032
Sig. (2-tailed)	0.042

3 Ordinal Logistic Regression (H3)

3.1 All Sectors Combined

Model Statistic	Value
Model χ^2	5.509
Sig.	0.064
Nagelkerke R^2	0.19

Predictor	β	Wald	Sig.
CESP Rank (1 vs 3)	–2.170	5.163	0.023
CESP Rank (2 vs 3)	–0.682	0.697	0.404

3.2 High Environmental Impact Sectors (SECGROUP = 1)

Model Statistic	Value
Model χ^2	4.749
Sig.	0.029
Nagelkerke R^2	0.37

Table 4.16: SPSS Output Extracts contd.

Predictor	β	Wald	Sig.
CESP Rank (1 vs 3)	–3.045	4.133	0.042

3.3 Low Environmental Impact Sectors (SECGROUP = 2)

Model Statistic	**Value**
Model χ^2	1.13
Sig.	0.288
Nagelkerke R^2	0.07

Predictor	β	Wald	Sig.
CESP Rank (1 vs 3)	–1.142	1.035	0.309

5. Qualitative Analysis

The qualitative data from annual reports, sustainability reports, press releases, and other public documents over the past five years were analysed to identify best practices in Corporate Environmental Sustainability Performance (CESP) among the leading companies.

5.1. High environmental impact sectors

Companies in the High environmental impact sectors show unique characteristics and challenges. Metals, Cement, and Oil and gas companies heavily depend on natural resources such as minerals, fossil fuels, and other raw materials. The extraction and processing of these resources have significant environmental impacts, including habitat destruction, air and water pollution, and large carbon footprints.

These sectors require substantial energy for processes such as smelting metals or refining oil, contributing to high greenhouse gas emissions. The production processes generate significant amounts of waste, including hazardous waste. Managing and disposing of this waste in an environmentally safe manner is a big challenge.

Governments and international bodies impose strict regulations on environmentally sensitive industries to mitigate their environmental impact. These regulations include emissions limits, waste management, and the use of cleaner technologies. Adhering to these regulations involves substantial investments in pollution control technologies, cleaner production methods, and sustainability initiatives, which are complex and costly. Companies in these industries are under greater public scrutiny due to their visible and significant

environmental impacts. Incidents like oil spills, mining accidents, or industrial pollution can lead to public outcry and damage a company's reputation. The environmental costs associated with these sectors are higher, such as rehabilitating mining sites, cleaning oil spills, and remediation of contaminated land.

Companies in environmentally sensitive sectors face higher insurance premiums and risk management costs due to the potential for environmental liabilities and disasters.

Shifting to more sustainable practices can be technically challenging and costly for these industries. Developing alternative materials or finding fewer polluting methods requires significant research and development.

The scale and complexity of operations in these industries mean that innovations for reducing environmental impact must be robust, scalable, and economically viable, which can be challenging.

Low Environmental Impact Sectors

Companies from the Low Environmentally Sensitive Sectors, such as FMCG, Healthcare, and Consumer durables, have lower direct environmental impacts. Their operations are less resource-intensive, generate less pollution, and face fewer regulatory pressures. Consequently, their environmental management efforts are less complex and costly.

5.2. Key initiatives of leading companies

Companies reported various strategies to reduce greenhouse gas emissions, including transitioning to renewable energy sources and improving operational

efficiency. Past research has linked emissions reductions to cost savings, improved efficiency, enhanced corporate reputation, and improved financial performance (Eccles *et al*., 2014; Guenster *et al*., 2011).

Companies in energy-intensive and non-energy-intensive sectors are investing in innovative technologies to reduce energy consumption. Examples include energy-efficient machinery, smart grids, and building automation systems.

Many companies, particularly water-intensive industries, have adopted rigorous water management practices. These include water recycling, rainwater harvesting, and process optimisation to reduce water usage.

High-quality sustainability reporting is common among top-performing companies.

Companies engage with stakeholders, including communities, employees, and investors, to promote sustainability with initiatives that include community development programs, employee training, and stakeholder consultations.

Sustainability Initiatives of High CESP Leaders

The CESP leading companies highlight how sustainability can drive their business strategy. Their efforts in improving environmental performance reflect their long-term commitment to corporate responsibility and sustainable growth.

- L2 has made sustainability a core part of its operations. With a strong focus on reducing its environmental footprint, the company has implemented several initiatives. L2 has established a 1.8 MW off-site solar farm in L3eta, Gujarat, to increase its renewable energy consumption. In FY 2022-23, 49% of the company's energy consumption was from renewable sources. The

company has implemented Zero Liquid Discharge (ZLD) systems at feasible manufacturing units, achieving a 44% reduction in freshwater consumption intensity compared to the FY 2018-19 baseline. L2 has reduced the use of virgin plastic in its packaging and incorporated Post-Consumer Recycled (PCR) plastics, using 145 metric tons of PCR plastics in FY 2022-23. L2 has introduced processes to reduce waste generation and focus on recycling and reusing materials within its manufacturing plants. The company is focused on developing eco-friendly products that are safe for consumers and the environment. This includes non-toxic water-based adhesives and sealants. L2 has invested in energy-efficient technologies across its manufacturing units, reducing carbon emissions and energy consumption.

- A1 is committed to driving sustainability in its production processes and product development. A1 maintains a sustainable supply chain, ensuring suppliers adhere to environmental standards and practices. A1 aims to achieve zero waste to landfill by enhancing waste management practices and increasing recycling.

  A1 has developed a range of electric trucks and buses, including the A1 Pro 2049 electric truck and the Skyline Pro-E electric buses. These vehicles feature high-energy storage batteries and reliable all-electric drivelines, aiming to reduce emissions in urban transportation. A1 showcased a prototype hydrogen fuel cell truck. All A1 trucks and buses are equipped with advanced telematics, enabling real-time monitoring and data analytics to improve fuel efficiency and reduce emissions. The Uptime Centre in Pithampur oversees this connected ecosystem, ensuring higher productivity and lower environmental impact.

- G1 deals in natural gas production and distribution; G1 has integrated sustainability into its operations, focusing on clean energy solutions. G1 has invested heavily in renewable energy projects, particularly solar and wind energy. G1 promotes natural gas as a cleaner alternative to coal and oil, significantly reducing the carbon footprint in industries that switch to this fuel.

  The company has a carbon management plan to monitor and reduce its greenhouse gas emissions across all its plants and pipelines. G1 has advanced its net-zero emission target to 2035, focusing on the electrification of natural gas-based equipment, the integration of renewable energy sources, the deployment of battery energy storage systems (BESS), the production of compressed biogas (CBG), the development of green hydrogen, CO_2 valorisation initiatives, and afforestation efforts. G1 has developed transparent sustainability reporting to ensure accountability and share progress on its environmental and social initiatives.

- P3 is committed to integrating sustainability in its production and R&D processes. The company is pioneering the adoption of green chemistry principles to reduce the environmental impact of its drug manufacturing processes. This involves reducing the use of harmful chemicals and adopting eco-friendly solvents.

  P3 has incorporated energy-efficient technologies in its plants, substantially reducing energy consumption and emissions. The company uses adequate waste segregation and hazardous waste disposal methods to minimise environmental damage. To reduce freshwater consumption, it has implemented water conservation programs in its facilities, including

rainwater harvesting and water recycling. The company has adopted advanced water treatment technologies to achieve Zero Liquid Discharge (ZLD) at its major manufacturing facilities.

- O5 focuses on sustainable material sourcing, particularly in its jewellery division, to ensure ethical sourcing of gold and diamonds. The company has embraced energy-efficient practices in its manufacturing facilities

  O5 has a dedicated focus on corporate social responsibility (CSR), especially in education, skill development, and rural development. O5 has increased the share of renewable energy in its total energy consumption to 55%, demonstrating a commitment to sustainable energy practices. The company has achieved a 50% reduction in specific water consumption, reflecting its efforts in water conservation. O5 has achieved a 95% recycling rate for hazardous waste, showcasing its commitment to responsible waste management.
- M1 is one of the largest zinc producers globally and has a well-defined sustainability strategy. M1 has committed to using renewable energy and aims to become a net-zero carbon company. It is actively investing in solar energy to power its operations. The company focuses on a circular economy model, where it recycles by-products such as slag and fly ash into usable forms, minimising waste.

  HZL has partnered with Aesir Technologies to develop zinc batteries, contributing to sustainable energy storage solutions. The company has inaugurated a ZLD plant at Zawar Mines, utilising advanced technology to facilitate water recovery and conservation. M1 is a water-positive company that adopts rainwater harvesting, wastewater recycling, and efficient water

usage techniques across its sites. The company takes steps to protect local ecosystems through biodiversity conservation programs and land reclamation after mining activities.

- F4 prioritises sustainable sourcing of its raw materials, particularly for its flagship products like coconut oil, ensuring that its supply chain is environmentally responsible. F4 has achieved 66.5% renewable energy usage in its manufacturing processes, significantly reducing its carbon footprint. The company has reduced energy intensity by 2.20% and water intensity by 2.4% in its operations, indicating improvements in resource efficiency. F4 has reduced virgin PET consumption in packaging by 130 metric tons and virgin LDPE consumption by 23 metric tons, aligning with its sustainable packaging goals. The company emphasises well-being, developing products that promote a healthy lifestyle while ensuring minimal environmental impact during production.

Development of Green belts

Many companies have undertaken initiatives to develop green belts and promote environmental sustainability. G1 (India) has implemented a comprehensive Environment Management Plan (EMP) that guides various greenbelt and biodiversity management activities across its sites, aligning its efforts with Sustainable Development Goals (SDGs) 14 and 15. G1 contributes to compensatory afforestation for pipeline projects traversing forest areas.

Oil and Natural Gas is committed to achieving zero emissions for Scope-1 and Scope-2 by 2038. The company plans investments in green initiatives, including

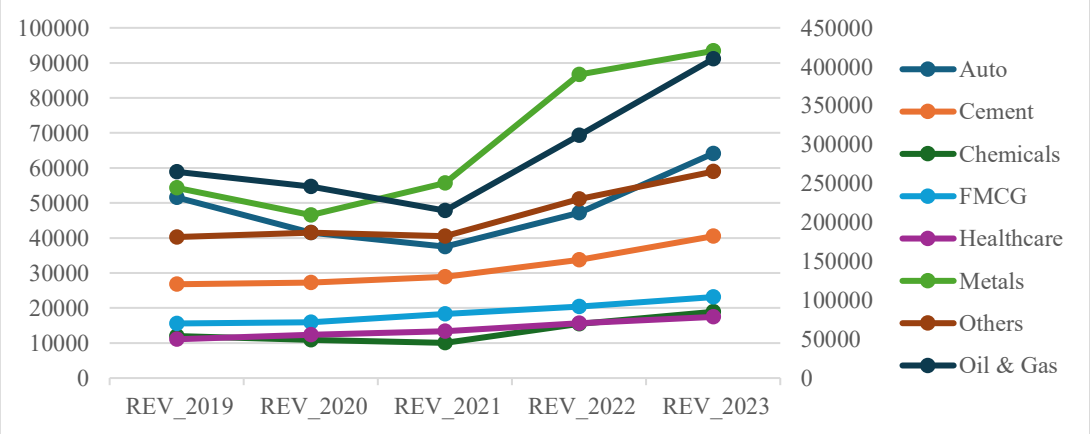
extensive afforestation projects aimed at carbon sequestration, biodiversity enhancement, and support for local livelihoods.

M4 has undertaken tree plantation drives to create green belts, aiming to enhance biodiversity and reduce the environmental impact of its operations. A3 has implemented green belt development as part of its sustainability initiatives. The company focuses on increasing green cover around its manufacturing plants and facilities to promote environmental sustainability. O3 has undertaken green belt development projects across its campuses and project sites to enhance environmental quality and support biodiversity.

5.3. Resilience in performance (2019-2023)

The revenue trends from 2018-19 to 2022-23 show that many companies faced a noticeable revenue dip or sluggish revenue growth in 2019-20 or 2020-21 due to the COVID-19 pandemic. The recovery phase in 2022 and 2023 highlights the resilience and growth trajectory across different sectors.

Figure 5.1. Revenue trends



Key observations

The Oil & Gas, Chemicals, and Auto sectors show a noticeable downtrend in the year 2020-21, followed by a sharp recovery and growth in 2021-22 and 2022-23. The Metals sector slowed down in 2019-20, followed by a solid recovery and exceptional growth in the subsequent years. M2, M3, and M4 show a strong recovery after 2021, with significant growth by 2023. The sector's financial performance shows resilience and growth.

Cement sectors have shown consistent recovery and growth after 2021, exhibiting steady financial performance; Healthcare, FMCG, and Others show steady growth, reflecting financial stability.

6. Discussion & Interpretation

This chapter integrates and interprets the findings from the preliminary data analysis, company-specific analysis, sector-specific analysis, and qualitative analysis to provide a comprehensive understanding of the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) in selected companies.

6.1. Data insights

An analysis of the CESP data shows that the companies in the Metals, Cement, Chemicals, and Oil and gas sectors have significantly high absolute and intensity of GHG emissions, Energy consumption, and Water consumption. The Cement industry has the highest emissions intensity and high absolute emissions, with substantial energy consumption intensity. The Metals and Chemicals sectors have significantly higher water consumption intensity as compared to the other sectors. Companies in the healthcare, Auto, FMCG, and Other (diversified) sectors show low absolute and intensities of GHG emissions and lower energy and water consumption.

High and Low Environmental Impact Industries

The sectors are categorised as High and Low Environmental Impact Sectors as follows:

High Environmental Impact (HEI)	Low Environmental Impact (LEI)
• Cement • Metals • Chemicals • Oil & Gas	• Healthcare • Auto • FMCG • Others

6.2. Trend Analysis

The analysis of the trends in the Corporate Environmental Sustainability Performance (CESP) metrics and the Sustained Financial Performance (SFP) of the selected sample companies over the five years from 2018-19 to 2022-23 shows the following:

- The overall trend shows a marginal annual change in the average absolute emissions, energy consumption, and water consumption over the five years. However, there is a decline in all the average intensity rates from 2018-19 to 2022-23, indicating CESP improvements and reduced environmental footprint per unit of revenue.
- The period from 2019-2021 shows a moderate increase or a minimal decline in GHG Emissions, Energy Consumption, and Water consumption intensities. This situation has significantly improved in 2021-22 and 2022-23.
- SFP leaders in FMCG, Metals and Other sectors show strong financial performance with increasing Return on Equity and Return on Assets. SFP and Auto SFP laggards exhibit decreasing trends in ROE and ROA, showing profitability and asset utilisation issues.
- FMCG companies show firm market valuation with an increasing Price-to-book (PB) ratio and Tobin's Q (TQ), indicating high investor confidence and perception of future growth potential.
- Revenue has increased over the past five years for most companies, indicating growth in business operations across the sectors.

6.3. CESP improvement analysis

The key findings from the analysis of the CESP improvement metrics, measured by the Compound Annual Growth rate of GHG Emissions Intensity (CAGR GI), CAGR of Energy Consumption Intensity (CAGR EI), and CAGR of Water Consumption Intensity (CAGR WI) over the five years, are given below:

GHG Emissions

- There is a slight overall average annual decrease in absolute emissions (1%) and a more pronounced rate of decline in the annual average emissions intensity (11%) year on year from 2018-19 to 2022-23. This indicates that, on average, companies are becoming more efficient in managing their emissions relative to their revenue growth.
- Metal company exhibits the highest rate of CAGR increase in absolute GHG emissions over five years, followed by Chemicals, with an improvement or a reduction in emissions intensity. The cement companies also show a growth rate in absolute emissions, but with reductions in emissions intensity.
- CESP leaders have reduced absolute emissions and decreased emissions intensity, indicating significant improvements in their environmental impact. Chemicals and Healthcare leaders exhibit the largest reduction in emissions intensity.

Energy Consumption

- The overall data across all companies shows an insignificant change in average annual absolute energy consumption and a 9% average annual reduction in energy intensity relative to revenue.

- Most companies exhibit a reduction in energy intensity, indicating that they are implementing measures to enhance their operational efficiency and reduce energy consumption relative to their revenue.
- Cement and Metal companies exhibit positive CAGR for absolute energy consumption, indicating increased total energy usage. However, they show improvements in energy intensity, indicating enhanced efficiency relative to their revenue.
- CESP laggard in the diversified sector shows a significant growth in annual absolute energy consumption by 12% and an increase in annual energy intensity by 4%.

Water Consumption

- The overall trend across all companies shows a small increase (1%) in absolute average water consumption and an annual average reduction in water intensity by 10%. This indicates that, on average, companies are becoming more efficient in managing their water consumption relative to their revenue growth. Most companies exhibit negative growth in water intensity, indicating that they are successfully implementing measures to reduce water consumption relative to their revenue.
- Laggards in Diversified and FMCG companies exhibit a positive CAGR for absolute water consumption, indicating increased total water usage. However, they show improvements in water intensity, indicating enhanced efficiency.

Overall observations

- Large variations are observed in the degree of CESP improvements within companies, intervening years, and within the industry sectors.

- The CAGR GI, CAGR EI, and CAGR WI reductions are closely correlated at the Company level, which shows that companies with a high focus on sustainability are reporting improvements across all three dimensions.

6.4. SFP analysis

This analysis looks at the Sustained Financial Performance metrics exhibited across the companies.

Return on Equity (ROE)

Top Companies with the highest ROE demonstrate excellent financial health and efficient use of equity. Companies with moderate ROE maintain steady profitability, indicating a balanced approach to managing equity and generating returns. Companies with low or negative ROE face significant challenges in profitability.

- FMCG companies show the highest 5-year average ROE, highlighting exceptional profitability and efficient utilisation of equity capital.
- The diversified sector companies show high profitability with a high 5-year average ROE.
- Cement companies have lower ROE compared to top performers, indicating lower profitability and efficiency.
- Laggards in Metals and Chemicals show very low ROE, indicating low profits generated from shareholders' equity.
- Laggard in the Auto sector (-7.59%) exhibits a negative ROE, reflecting inefficiencies in utilising equity capital.

Return on Assets (ROA)

Companies with the highest ROA demonstrate excellent financial health and efficient use of assets. Companies with moderate ROA maintain steady profitability, indicating a balanced approach to managing assets and generating returns. Companies with low or negative ROA face reduced asset utilisation efficiency.

- FMCG leads with the highest 5-year average ROA, indicating exceptional efficiency in utilising its assets to generate profit.
- Laggard in the Auto sector (-1.95%) exhibits a negative ROA, reflecting inefficiencies in utilising assets.

Price to Book Ratio (P/B)

Companies with the highest P/B ratios, such as F3 and F1, demonstrate strong market confidence and high investor valuation. These companies are perceived as having high growth potential and solid financial health. Companies with moderate P/B ratios maintain steady market valuations, indicating a balanced view of their growth potential and financial stability. Companies with low or exceptionally low P/B ratios need to improve their financial performance and market perception to enhance their P/B ratios.

- FMCG leads with the highest 5-year average P/B ratio, indicating strong market confidence.
- Consumer durables and diversified companies also exhibit very high P/B ratios, reflecting high market valuation and growth expectations.
- Metals laggards and Oil & Gas companies exhibit the lowest P/B ratios, indicating low market valuation.

Tobin's Q (TQ)

Tobin's Q highlights the companies' varying market valuation levels. Companies with the highest Tobin's Q ratios demonstrate strong market confidence and high investor valuation. Companies with moderate Tobin's Q ratios maintain steady market valuations. Companies with low Tobin's Q ratios have a low market valuation by investors.

- Chemicals leader has the highest Tobin's Q, followed by FMCG companies, and consumer durables, indicating exceptional market valuation and investor confidence in its growth potential.
- Tobin's Q of laggards in Chemicals, Metals and Others sectors are well below 1. The Oil & gas companies also exhibit an average Tobin's Q noticeably below 1, indicating challenges in market valuation and perception.

Revenue Growth (REV CAGR)

Companies with the highest revenue CAGR demonstrate strong business growth and successful market strategies. Companies with low or negative revenue growth face significant challenges in expanding their market presence.

- Chemicals leader (20%) shows the highest 5-year revenue CAGR, indicating exceptional revenue growth, followed by Oil & Gas and consumer durables.
- SFP laggards in Healthcare, Auto, Others. Oil & Gas and FMCG show low to negative revenue growth, indicating limited business growth.

Overall Observations

Significant variations are observed in the CESP and SFP data within the companies and the Sectors. The CAGR GI, CAGR EI, and CAGR WI reductions are closely related at the Company level. In the case of SFP, accounting-based

measures ROE and ROA are closely correlated, whereas the market-based measures PB and Tobin's Q are closely correlated to each other.

6.5. Comparison of Company-specific CESP and SFP

The following analysis provides insights into the interplay between the selected companies' environmental practices and financial outcomes. There is a wide variation in CESP and SFP data at the Company level.

- Leading Companies in Oil & Gas, Chemicals, Metals and Auto exhibit high CESP and SFP metrics.
- Companies lagging in the Auto and Others sectors show low CESP and SFP.
- Some Companies with lower GI, EI, and WI reductions have exhibited high profitability, whereas Oil & Gas companies show lower CESP with poorer financial metrics.
- Outliers and mixed results are seen in cases which exhibit a low reduction in sustainability indicators but remarkably high ROE and ROA, indicating high financial health and a low focus on sustainability. SFP Laggard in Metals shows high GI, EI, and WI reductions but poor financial performance. Healthcare CESP laggard shows high SFP with minimal CESP improvements.

6.6. Comparison of Company Percentile Rankings

The comparison of the CESP overall percentile range and the overall SFP percentile range shows variability, and companies exhibit various combinations, with those with high, moderate, or low CESP and high, moderate, or low SFP.

- Chemicals leader excels in sustainability and financial metrics, with a top percentile range for all the CESP and SFP metrics. CESP leader in

Healthcare shows a high CESP percentile but moderate financial performance. FMCG demonstrates high CESP with high ROE, ROA, PB, and TQ but low revenue growth.

- FMCG laggard shows financial outperformance on all metrics except revenue growth with low CESP efforts.

6.7. Sectoral Performance Analysis

The sectoral overall averages analysis indicates that sectors such as the Chemicals, Healthcare, and Oil & Gas sectors, with moderately average financial performance, as seen in their ROE, ROA, PB, and TQ ratios, have shown higher-than-average reductions in CESP metrics. Sectors like FMCG and Others exhibit high market valuations and exceptionally strong financial metrics and show overall moderate to low reductions in CESP metrics. The Cement sector shows poor CESP with lower SFP. There is no evidence of a correlation between the average sectoral CESP variables and the SFP CAGR of Revenue.

- The Chemicals sector demonstrates an above-average reduction in CESP, with GI, EI, and WI, aligning with relatively financially high-performance metrics in Return on Equity (ROE) and Price to Book (PB). The sector's REVCAGR indicates high revenue growth. The high overall CESP indicates an integrated approach to sustainability combined with the sector's financial success.
- The Oil & Gas sector exhibits a moderate reduction in GI, EI, and WI on average, which correlates with moderate financial metrics such as ROE and ROA. However, the PB and TQ indicate low market valuation due to the sector's inherent environmental challenges. The revenue shows steady

growth, indicating that efforts to reduce environmental impacts reflect moderate financial performance and financial stability.

- The Healthcare sector shows significant reductions in EI and GI, with a lower decrease in WI. The sector has an average ROE and ROA. The relatively high PB and TQ indicate that the market recognises the sector's potential for sustainable growth. The high average CESP score demonstrates the sector's commitment to sustainability despite the low overall environmental impact of the industry.
- The Metals sector reports moderate reductions in GI, EI, and WI, with a high ROE and ROA. The sector's PB ratio and TQ reflect moderate but cautious market perceptions. The REVCAGR indicates steady growth. The sector's average CESP aligns with its moderate financial performance.
- The Auto sector displays moderate reductions in CESP, GI, EI and WI. Financial performance indicators such as ROE and ROA indicate steady, moderate returns. The sector's PB ratio and TQ indicate reasonable market confidence. The sector's average CESP (10%) indicates a moderate integration of sustainability practices, with the possibility for improvement in translating these into higher financial returns.
- The FMCG sector shows lower reductions in GI, EI, and WI and has the highest average ROE and ROA. The sector's PB ratio and TQ are significantly higher than other sectors, reflecting strong market confidence and valuation. The REVCAGR is moderate, indicating that sustainability practices are not directly correlated to contributing to the sector's financial success. The sector's below-average CESP indicates that low environmental efforts are combined with substantial financial benefits.

- The Others category, which includes diversified sectors like construction and consumer durables, shows overall average reductions in GI, with low reductions in EI and WI. The financial performance indicators are strong, with a high ROE, ROA, PB and TQ. The REVCAGR indicates moderate growth, supported by an overall low focus on sustainability efforts, as reflected in the below-average CESP.
- The Cement sector shows the least reduction in GHG Emissions Intensity, Energy consumption intensity, and Water consumption intensity, with low financial returns as seen in ROE and ROA. The sector's PB ratio and TQ indicate cautious market valuation due to the sector's high environmental impact. The low revenue growth REVCAGR and the sector's low CESP indicate that there is significant room for improvement in aligning sustainability practices with financial performance.

There is a wide variation in both the CESP and SFP performances between the sectors. The SFP is strongly linked to the unique characteristics of the sector-specific business model and economic environment. For example, the FMCG sector has a very high average ROE of 38%, significantly above the average ROE of 18%. The Auto and the Cement sectors have very low average ROEs of 12% and 14%, respectively. It is important to compare the performance of the individual companies based on a comparison with the respective sectoral performance of the industry sector to which they belong.

6.8. Company-Level Analysis at the Sectoral Level

High-impact sectors pose significant challenges, but companies that excel in CESP see financial benefits. Low-impact sectors show more consistent

performance, with sustainability becoming a standard part of business operations.

High Environmental Impact Sectors

- The Companies in the Chemicals and Oil & Gas sectors strongly correlate with the higher performing companies in CESP (GI, EI, and WI reduction), showing high SFP performance on ROE, ROA, PB, and Tobin's Q.
- The Companies in the Metals sector exhibit mixed results with moderate correlation, with the leader performing well on both CESP and SFP dimensions. Metals laggard shows strong CESP but low financial performance on all metrics. The mid performer in Metals shows low CESP and higher performance on PB, whereas the laggard shows low performance on CESP and PB, with high revenue growth.
- In the case of the Cement Sector, both companies show low performance on CESP with moderate ROE & ROA but relatively higher market-based SFP measures, PB and TQ.

Low environmental impact sectors

- The Healthcare sector companies show mixed results with CESP and SFP linkage. Companies showing significant CESP performance but score moderate to low performance on financial metrics. CESP laggard has the highest SFP with the lowest CESP in the sector.
- The Auto Sector has a moderate correlation of CESP with SFP, with the leader showing very good performance across CESP and ROA, ROE, PB, and Tobin's Q, with a moderate performance in Revenue CAGR. The mid performer has a moderately high CESP with moderate SFP performance.

Laggard shows poor performance in both CESP and SFP, except PBTQ, where it performs moderately..

- The FMCG Sector shows a negative correlation, with mid performer having a very high CESP but relatively moderate sectoral SFP performance on all metrics. The other companies exhibit stronger SFP despite having poor CESP performance.
- The Others (diversified) sector shows a moderate correlation of CESP with SFP. The Leader exhibits strong CESP and SFP on all metrics, with the highest Revenue CAGR. Mid performer has moderate CESP with outperformance in PBTQ. The laggard performs poorly on both CESP and SFP indicators.

6.9. Sectoral Company CESP SFP percentiles

This analysis compares the average consolidated percentile scores of CESP and SFP variables for each company categorised under the respective sectors.

Key observations

- Overall, while there is a general positive correlation trend between sustainability and financial performance for the Chemicals, Oil & Gas, Metals, Cement, Auto, and Other (diversified) sectors, the strength of this relationship varies across sectors and companies.
- High Performers show that strong sustainability practices positively correlate with financial performance.
- Inconsistent Performers with a high CESP but lower SFP are not translating their sustainability efforts into financial returns.

- FMCG companies show extremely high SFP with moderate to low CESP, indicating a poor correlation between CESP and SFP.

- High Sectoral relative CESP and SFP percentile:

  Leaders from Oil & Gas, Chemicals, Metals, Others and Auto sectors exhibit high performance in both CESP and SFP, indicating that the companies' sustainability initiatives translate into strong financial outcomes. This reflects a positive correlation between high environmental performance and financial results.

- Lowest relative CESP and SFP percentile ***:***

  Laggards from Chemicals, Oil & Gas, Auto, Metals, Others, and Cement sectors exhibit low performance in both areas, indicating either insufficient focus on sustainability or that current efforts are not translating into financial gains. This shows that there is a correlation between low sustainability and poor financial performance in these sectors.

6.10. CESP SFP relative to sectoral averages

This analysis compares the company-level CESP and SFP variables relative to the sectoral average scores. The company-level sectoral average comparison analysis reveals that companies leading in CESP within the environmental impact categories exhibit above-average financial performance metrics within their sectors, particularly in high-impact sectors.

High Environmental Impact Sectors

The Companies in the Chemicals and Oil & Gas sectors show a strong correlation with the above-average performing companies in CESP (GI, EI, and WI reduction), with strong SFP performance on ROE, ROA, PB, and Tobin's Q.

The Metals sector exhibits mixed results with moderate correlation, with the one CESP leader performing above average on both CESP and SFP dimensions. The other CESP leader shows strong CESP but low financial performance on all metrics. The mid performer shows low CESP and above-average performance on PB, whereas the laggard shows low performance on CESP and PB, with high revenue growth. In the case of the Cement Sector, both companies show poor performance on CESP, with average SFP metrics.

Sector-wise analysis

- **Chemicals Sector:**

  The leader shows the highest CESP and significant above-average performance in all the CESP metrics and SFP metrics, except REV CAGR. Mid performer performance is mixed, with an above-average reduction in EI and a below-average reduction in GI and WI. The company's financial metrics are above average in revenue growth but lower in ROE, ROA, TQ and PB. The laggard has moderate but above-average EI and below-average GI and WI scores. Financial performance is weak, with SFP metrics well below sectoral averages.

- **Oil & Gas Sector:**

  The leader demonstrates strong sustainability performance, with significantly above-average CESP and SFP and high revenue growth. The mid performer shows below-average performance in EI, GI, and WI. Financial performance is moderate, with below-average scores. In the case of the laggard, CESP and SFP metrics are low and below average.

- **Metals Sector:**

M1 exhibits above-average EI and GI scores, whereas WI is marginally below the sectoral average. Financial performance is significantly above average, except for revenue growth. M2 shows above-average performance in CESP, but SFP metrics are weaker and well below average. M3 demonstrates high performance in GI but lags in EI & WI. Financial performance is average, with a high market valuation. M4 shows lower sustainability metrics, with below-average GI and EI. Financial performance is weaker on market valuation, with good revenue growth.

- **Cement Sector:**

  C1 and C2 perform poorly on CESP within the high environmental impact sectors category. Their financial Performance is moderate, with mixed-around average results.

Low Environmental Impact Sectors

The analysis shows significant variability in how companies within low environmental impact sectors manage their sustainability practices and financial performance. A1 and O5 perform well in both areas, highlighting the potential of integrating sustainability into corporate strategy. A5, O3, and O4 face challenges in both sustainability efforts and financial goals.

- **Auto Sector**:

  The Auto Sector has a moderate correlation with CESP and SFP. A1 outperforms the sector average across several metrics. It shows higher values in CAGR EI, CAGR GI, and CAGR WI, indicating significant improvements in energy, greenhouse gas, and water intensity. Financial performance shows above-average ROE, ROA, and TQ. The company's revenue growth

outpaces the sector average. A2 shows a mixed performance, with below-average scores in CAGR, EI, and GI. However, it demonstrates a high ROE and a good TQ, although revenue growth is stagnant. A3 displays average performance in environmental metrics with a slight outperformance in GI. Financial metrics are below the sector average, with lower ROA and PB, but the company shows strong revenue growth.

A4 demonstrates high performance in CAGR EI but lower-than-average performance in GI. Financial metrics like ROE and TQ are near the sector average, with high revenue growth. A5 underperforms in all metrics, particularly with negative growth in CAGR EI and a negative ROE. Despite an average TQ, the company's revenue growth (-0.34) indicates significant financial challenges.

- **FMCG Sector**:

  The FMCG Sector shows a negative correlation, with F4 having a very high CESP but average to below-average SFP performance on all metrics except ROA. The other companies exhibit strong SFP despite having poor CESP performance.

  F3 shows superior performance in GI reduction but lower-than-average performance in EI and WI reductions. Still, it stands out on SFP metrics, with a high TQ, indicating high market valuation. The company has a strong ROE and above-average revenue growth. F1 performs below average in most environmental metrics but with strong financial metrics, indicating good profitability and market valuation. F2 lags in CESP and SFP metrics, particularly in WI and TQ, which may indicate weaker sustainability practices and market confidence.

- **Healthcare Sector**

  The Healthcare sector companies show mixed results with CESP and SFP linkage. P3 has significantly above-average CESP performance, but scores above average only on ROA and Revenue growth. P4 has good CESP but does well only on the Revenue CAGR and has below-average SFP performance on ROE, ROA, PB, and TQ. This is also due to the outlier P2, which correlates negatively with a poor CESP performance but an excellent SFP on all metrics except Revenue CAGR. This affects the overall sector averages. P1 underperforms in most CESP metrics, particularly in EI, but shows moderate financial returns with ROA below the sector average. The company's revenue growth is also below average. P2 exhibits poor performance in CESP metrics, particularly with a negative reduction in WI. The company performs well in financial metrics, with above-average ROE and TQ.

- **Others Sector**:

  This sector shows a moderate correlation between sustainability and financial metrics. O5 excels across CESP and SFP metrics, particularly in EI and TQ, reflecting strong sustainability practices and market confidence. O1 shows strong performance across CESP and SFP metrics, with high TQ and revenue growth. O2's performance is mixed, with moderate CESP metrics and strong ROE. O3 underperforms across most metrics, particularly in TQ. O4 performs poorly in CESP metrics, particularly GI. The company also shows below-average financial performance, with lower ROE and revenue growth.

6.11. Sectoral Rankings and Analysis

The analysis of the relative sectoral average of CESP and SFP performance is ranked within the sectors for high environmental impact. The findings are consistent with the sectoral percentile analysis and indicate the following:

- **Chemicals Sector**:

  L2 ranks on top across all metrics, particularly excelling in accounting metrics of financial performance (ROE & ROA), Price-to-book ratio, Tobin's Q, and sustainability (CESP). L3 performs better in revenue growth. However, it lags behind L2 in financial returns and sustainability efforts. L1 ranks the lowest in all categories within the Chemicals sector.

- **Oil & Gas Sector**:

  G1 leads across all metrics, demonstrating a strong integration of sustainability with financial performance. Its top rankings in ROE, ROA, and CESP reflect its ability to effectively manage environmental impact while delivering strong financial results. G3 shows moderate financial returns but lags in revenue growth, indicating challenges in expanding its market presence. Its sustainability performance is not on par with G1, indicating potential areas for enhancement. G2 ranks low in financial performance (ROE+ROA) and CESP, pointing to significant challenges.

- **Metals Sector**:

  M1 has top financial performance and CESP rankings despite lower revenue growth. This indicates that while it may be expanding slowly, it is highly efficient in its operations and sustainability practices. M3 shows a high price-to-book ratio, indicating a strong market valuation. M2 shows outperformance in sustainability but struggles with financial returns. The

disparity between its CESP ranking and financial performance indicates that sustainability initiatives have yet to translate into strong financial outcomes. M4's rankings reveal high revenue growth, but it faces significant challenges in sustainability and market valuation (PBTQ). This indicates that rapid growth may come at the expense of financial returns and sustainability integration.

- **Cement Sector**:

  C1 scores moderately better in financial performance in all metrics except revenue growth. C2 shows better revenue growth but performs below C1 in other metrics.

6.12. Sectoral Leadership

Companies that excel in CESP show strong financial metrics, highlighting the importance of sustainability in driving overall business success. Mid-performers and laggards need to improve in either or both areas to match the leaders in their respective sectors.

- Leaders:

  L2, G1, O5, M1, and A1 consistently rank highest across financial and sustainability metrics. These companies exemplify how strong environmental management can lead to superior financial outcomes.

- Mid-Performers:

  L3, P4, and G3 exhibit moderately high performance but have areas that require enhancement, particularly in sustainability integration, to capitalise on financial returns fully.

- Laggards:

G2, C2, A5, C1, and M4 face challenges in both financial performance and sustainability efforts.

- Leaders in High Environmental Impact Sectors:

  L2, M1, and G1 demonstrate that it is possible to lead in sustainability and profitability, even in industries with significant environmental challenges.

- Laggards in High Environmental Impact Sectors:

  Cement companies M4 and G2 highlight the difficulties faced by traditional industries in adapting to sustainability requirements.

- Leaders in Low-Impact Sectors:

  P3 and O5 show that strong CESP performance can be achieved even in sectors with lower environmental impacts.

High Environmental Impact Sectors

High-environmental-impact sectors show a broader range of SFP performance outcomes, with leaders implementing advanced sustainability initiatives that complement financial success. However, laggards in these sectors tend to struggle significantly, reflecting the inherent difficulty of managing environmental impacts in resource-intensive or highly polluting industries.

- **Metals Sector**:

  The leader, M1 (M1), demonstrated strong performance in both environmental sustainability (CESP) and financial performance (SFP). This indicates that sustainable practices in resource-intensive industries like metals can correlate with financial returns. M3 performed moderately in SFP despite low CESP. M4 fell into the laggard category, struggling to manage its environmental footprint effectively while facing challenges in financial performance.

- **Cement Sector:**

  C2 and C1 are laggards due to their poor sectoral performance. This reflects challenges in reducing environmental impact and achieving financial outcomes. The cement industry's inherent environmental challenges, such as managing GHG emissions and resource usage, contribute to these results.

- **Oil & Gas Sector:**

  G1 stood out as a leader with a balanced approach to sustainability and profitability. This indicates that prioritising environmental performance can align with financial success even in fossil fuel-heavy industries. G2 and G3 were laggards in CESP and struggled in SFP. This reflects the traditional challenges of the oil and gas industry, where high environmental impacts are coupled with fluctuating financial performance.

- **Chemicals Sector:**

  L2 excelled in both CESP and SFP, demonstrating that companies in this sector can effectively manage their environmental impact while maintaining strong financial metrics. L1 was a laggard in CESP and SFP.

Low Environmental Impact Sectors

Low Environmental Impact Sector Companies generally show more consistent financial performance, with sustainability efforts more easily integrated into their business models. The variation between leaders and laggards is less pronounced, indicating that the barriers to achieving strong CESP and SFP are lower in these sectors.

- **FMCG**

  F4 demonstrated strong performance in both CESP and SFP, showing that consumer-facing companies focus on sustainability as part of their brand and

operational strategies. F3 and F1 showed exceptional SFP with low attention to sustainability, indicating a poor correlation between CESP and SFP in the FMCG sector. F2's lower performance in CESP indicates opportunities for improvement in integrating sustainability into its business practices.

- **Automobiles**

  A1 excels in CESP, indicating that companies can find ways to lead in sustainability even in sectors traditionally not directly associated with high Scope 1 and Scope 2 emissions. A5 and A2 underperformed in CESP with mixed results in SFP, indicating that the auto sector still faces challenges balancing environmental concerns with financial success.

- **Healthcare:**

  The CESP Leader has high scores in both CESP and SFP if we exclude the CESP laggard, an outlier with low CESP and very high SFP in all metrics except revenue growth. This shows that the healthcare sector, while not traditionally seen as environmentally intensive, can benefit from sustainable practices. The laggard company's lower performance in CESP indicates room for better environmental practices, even in a low-impact industry.

6.13. Sector-Specific relationships

The strength of the CESP-SFP relationship varies by sector. In high-impact sectors such as Chemicals, Cement, and Oil and gas, companies that lead in CESP achieve better financial outcomes despite facing significant challenges. In lower-impact sectors like FMCG and Healthcare, the relationship is mixed, with a less noticeable direct impact of CESP on SFP.

High-environmental-impact sectors (Metals, Cement, Oil & Gas, Chemicals)

A significant correlation between environmental sustainability and financial performance is evident across the sectors analysed. Companies with high CESP scores exhibit strong financial metrics, indicating that sustainability efforts can enhance financial outcomes. Companies with poor environmental performance tend to struggle financially, highlighting the financial risks of neglecting sustainability. The sector-specific relationship analysis is given below:

- The Chemicals sector correlates positively with financial metrics like ROE, ROA, PB, and TQ. This indicates that higher CESP is strongly associated with improved financial performance in this sector. However, CESP negatively correlates slightly with Revenue CAGR, indicating that while financial ratios improve, revenue growth may not follow.
- The Oil and gas sector strongly correlates with ROE & ROA, PB, and Revenue CAGR. This implies that sustainability efforts in this sector positively impact profitability (ROE) and asset valuation (PB), and the effect on revenue is also significant.
- The metals sector shows negative correlations with PB and TQ, indicating that increased sustainability in metals may reduce market valuations and performance based on these financial ratios. The weak or negative correlations with ROE and ROA indicate that sustainability does not align with profitability metrics. A moderate positive correlation with Revenue CAGR indicates that while profitability suffers, revenue growth may benefit from sustainability efforts.

- The cement sector strongly correlates with financial metrics, especially ROA and PB. This indicates that in the cement sector, low CESP aligns with lower overall financial performance, including valuation and profitability**.**

Low-Environmental-Impact Sectors

- CESP leaders successfully integrate sustainability into their operations. The SFP gap between leaders and laggards is narrower, indicating that achieving high performance in SFP is less challenging in these sectors.
- The healthcare sector shows weak negative correlations across most metrics, especially PB and TQ. This indicates that sustainability efforts in healthcare do not have a strong positive influence on financial performance, with negative impacts on market valuations.
- The auto sector shows positive correlations, particularly with PB and TQ. This indicates that sustainability positively influences market-based valuations in the auto sector, though the effect on revenue growth is negative.
- The FMCG sector shows low correlations with ROE, ROA, and Revenue CAGR, indicating that sustainability is not linked to financial performance in this sector.
- The Others sector shows weak to moderate correlations with financial metrics, except for a positive correlation with Revenue CAGR, indicating that revenue growth benefits from CESP.

Overall Insights

- The financial impact of sustainability varies widely across industries, with high-impact sectors benefiting more from improved CESP than low-impact sectors.

- For sectors like Chemicals and Oil & Gas, sustainability performance (CESP) strongly correlates to financial metrics, indicating that sustainability initiatives are rewarded by better profitability and asset utilisation. The Metals sector shows a contrasting result, where higher CESP is negatively correlated with financial metrics.
- Revenue growth (CAGR) shows mixed results across sectors. It is positively correlated in Oil and gas and FMCG, but weak or negative in the Healthcare and Auto sectors.
- In the Healthcare, FMCG, and Auto sectors, the correlation between environmental sustainability and financial performance is more nuanced. Some companies show that strong environmental practices are combined with financial success. Others show that financial success can be achieved even with a lower environmental sustainability performance, indicating a poor correlation between environmental sustainability performance and financial outcomes.

6.14. Hypothesis Testing

The analysis reveals a statistically significant and moderately positive relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) across top NSE-listed non-financial companies. Companies with stronger sustainability metrics—lower energy, water, and emissions intensity—tend to show better financial outcomes, as confirmed by Spearman's correlation ($\rho = 0.388$, $p = 0.034$). Mann–Whitney U results further validate this by showing that high-CESP firms significantly outperform low-CESP peers in financial rank ($p = 0.042$). Sector-level ordinal regressions indicate that this relationship is particularly strong in high

environmental impact industries (p = 0.029), while no significant effect is observed in low-impact sectors. These findings suggest that environmental sustainability is not only ethically sound but also financially strategic—especially for sectors with high ecological footprints.

6.15. Key insights

- This study shows that strong environmental practices, including carbon management, energy efficiency, and water conservation, positively influence long-term financial performance. Leaders in sustainability practices highlight the benefits of integrating sustainability into corporate strategy.
- Companies underperforming in sustainability need help with managing their environmental footprint with financial performance, underscoring the importance of integrating environmental considerations into core business strategies.
- The leading companies have successfully integrated sustainability into their core business strategies, enhancing financial performance. These firms have adopted various initiatives, from energy efficiency and waste management to sustainable sourcing and product innovation, which have reduced their environmental impact while driving profitability. The positive correlation between CESP and SFP in these companies highlights the importance of sustainability as a strategic priority for achieving long-term financial success.
- These leaders show a commitment to integrating sustainability into their core business strategies, which enhances their environmental performance and contributes to long-term financial success and stakeholder trust.

6.16. Implications of Findings on Future Corporate Strategies

The findings of this analysis have important implications for the development of future corporate strategies in the context of integrating environmental sustainability with financial performance. Companies across various sectors can use these insights to refine their strategies, enhance competitiveness, and ensure long-term viability.

- The leaders show improvements across all the parameters, which shows a strong commitment and holistic sustainability strategy with measurable and reportable impacts and outcomes. Leaders in sustainability practices have integrated environmental management into their core business strategies, demonstrating a commitment to long-term environmental and financial performance.
- These findings indicate that future corporate strategies should emphasise sustainability as a key driver of long-term financial success. Companies can enhance their market position and shareholder value by embedding sustainability into corporate culture and operations. This commitment is reflected in their mission statements, long-term goals, and regular progress tracking
- Firms that excel in CESP and SFP, such as L2 and M1, show that sustainability can be a significant competitive advantage. Future strategies should focus on sustainability as a driver of innovation and differentiation in the market.

- The leading companies have invested in advanced technologies for energy efficiency, water conservation, and carbon management, resulting in significant cost savings and environmental benefits.
- While many companies are making progress in reducing energy intensity, continuous efforts are needed to achieve absolute reductions in energy consumption. Despite lowering energy intensity, some companies show growth in absolute energy consumption.
- Proactive environmental management prepares these companies for future regulatory changes, reducing compliance risks and accessing incentives. The firms leading in sustainability leverage technological innovations to achieve superior financial results. Firms should increase R&D investment to develop new processes and products that align with sustainability goals.
- Investing in advanced energy efficiency technologies and water conservation can yield high returns. Companies in high-impact sectors should invest in green technologies that enhance efficiency and reduce environmental impacts. For example, L2 implemented ZLD systems at manufacturing units, whereas F4 Limited reduced virgin plastic use and adopted Post-Consumer Recycled (PCR) plastics. A1 developed electric vehicles and hydrogen fuel cell technology, and O5 Company Limited has increased renewable energy use by 55%. G1 (India) Limited focused on green hydrogen production and integration into the energy mix, and M1 Limited focused on Zinc-Based Battery development.
- Innovations in product design, manufacturing processes, and supply chain management that reduce environmental impact can significantly

improve CESP and SFP. Investment in innovative technologies substantially improves environmental and financial performance. These investments lead to operational efficiencies and cost savings.

- Efficient use of resources, such as energy and water, leads to significant cost savings and improved financial performance. Companies with robust resource management programs see better financial health.
- Mid-performers, mainly those close to the threshold of becoming leaders, also find strategic value in enhancing their sustainability initiatives to boost financial returns. Mid-performing companies can benefit from a holistic focus on all aspects of environmental impact, with measurable outcomes to leverage operational efficiencies, competitive advantage, and financial performance.
- Sectors with companies that lag in CESP and SFP would benefit from targeted improvements in sustainability practices, enhancing their financial performance over time.
- For laggards, improving CESP requires a comprehensive and committed approach, starting with an assessment of current practices and followed by targeted actions to enhance sustainability. By adopting these strategies, laggards can improve their environmental performance, unlock new financial opportunities, align with regulatory requirements, and meet the growing demands of environmentally conscious consumers and investors.
- For sectors such as Cement, Metals, Oil & Gas, and Chemicals, where environmental impact is more pronounced, companies must adopt aggressive sustainability practices to mitigate risks and enhance financial

returns. Strategies in these sectors should focus on reducing carbon footprints, improving energy efficiency, and minimising water usage, as these areas strongly correlate with financial performance.

- In sectors like FMCG and Healthcare, where the environmental impact is relatively lower, companies should focus on maintaining sustainability practices as a standard business operation. Companies should continuously monitor and improve their sustainability practices to stay ahead of regulatory changes and market expectations in sectors with lower environmental impacts. These sectors can benefit from continued investment in sustainability to maintain strong market valuations and financial performance.
- Future strategies should include proactive risk management practices to address environmental, regulatory, and market risks associated with poor sustainability performance. Companies must ensure compliance with evolving environmental regulations, which impact financial performance. Firms in high-impact sectors should anticipate and adapt to regulatory changes to avoid financial penalties and reputational damage.
- Transparency in reporting CESP metrics and aligning them with financial performance can enhance stakeholder trust and support. Engaging stakeholders in the development and execution of sustainability strategies can lead to better outcomes. Companies should seek input from stakeholders to ensure that their sustainability practices meet the expectations of all parties involved. Transparent sustainability reporting enhances investor confidence and market valuation. High-quality reports and third-party audits are standard among top-performing companies.

- Companies should view sustainability not only as a compliance or risk management tool but also as a long-term strategy for value creation. The findings indicate that firms with robust sustainability practices are better positioned to achieve sustained financial success. Incorporating sustainability into corporate strategy builds resilience against market fluctuations, environmental risks, and changing consumer preferences. This resilience is important for maintaining a competitive advantage and ensuring long-term profitability.

A new business vision has been developed by those advocating for creating a net positive impact on society rather than just reducing harm. Developed by 2020, Forum for the Future, WWFUK, and the Climate Group, this framework indicates that businesses should provide regenerative services to people, the planet, and society (Hollender, 2015). A Net Positive Impact approach enables companies to think outside the box and develop new products and services to solve societal problems and provide returns to shareholders, demonstrating how sustainability drives innovation.

Conclusion

The findings highlight the importance of integrating environmental sustainability into corporate strategies across sectors. Companies that successfully align their CESP with financial performance improve their market standing and secure long-term profitability and resilience. By focusing on innovation, sector-specific strategy, and stakeholder engagement, companies can turn sustainability challenges into opportunities for growth and success. The study highlights the

strategic implications of integrating sustainability into business models, offering a framework for future research on corporate sustainability strategies.

6.17. Policy Recommendations

The study offers actionable policy recommendations, providing a basis for policymakers to develop regulations and incentives that promote corporate sustainability. This contributes to the literature on the role of public policy in fostering sustainable business practices (Ruggie, 2008; Elkington, 1997). These policy recommendations highlight the need for supportive regulatory environments and financial incentives to encourage companies to adopt and maintain high sustainability standards.

- Policies should encourage companies to adopt sustainable practices through incentives, subsidies, and tax benefits for renewable energy, waste management, and water conservation projects. Incentives like renewable energy subsidies and tax benefits directly encourage such companies to prioritise sustainable investments, making these practices economically viable**.** For example**,** L2 increased its renewable energy consumption to 49% by leveraging subsidies for solar energy projects, such as its solar farm in Gujarat. Through government-supported carbon credits, M4 has enhanced its carbon capture and utilisation (CCU) technology to reduce emissions. P3 uses advanced Zero Liquid Discharge (ZLD) systems for wastewater management, incentivised by reduced water taxes.
- Implementing and enforcing stricter environmental regulations can drive companies towards better sustainability practices and reduce overall environmental impact. Strengthening regulatory frameworks and ensuring enforcement can drive companies to adopt and maintain high sustainability

standards. Transparent and predictable regulations can also reduce compliance costs and risks.

- India's push for green hydrogen and mandates for energy-intensive industries have driven M3 to develop hydrogen-based steel production technologies. Compliance with plastic waste management regulations prompted F4 to reduce virgin PET and LDPE use in packaging. Regulatory frameworks on water usage led to the deployment of ZLD plants and advanced water recovery systems.
- Encouraging public-private partnerships can facilitate the sharing of best practices and technologies, promoting industry-wide improvements in sustainability. For example, M1 collaborated with Aesir Technologies to develop zinc-based batteries for clean energy storage; A1 worked with government bodies under the Green Hydrogen Mission to prototype hydrogen fuel cell vehicles; O3 participated in public-private projects for infrastructure development with a focus on green buildings and water resource management.
- Encouraging transparent reporting and accountability through mandatory sustainability disclosures can enhance stakeholder confidence and drive market valuation. Policymakers should consider mandating sustainability reporting for all publicly listed companies. Consistency and completeness are required in quantitative data reporting, with detailed guidelines for the preparation of sustainability reports. The BRSR reports prepared by top-listed companies have greatly enhanced the disclosure and transparency of information to stakeholders
- Examples of specific policy recommendations include:

- Incentivise ZLD adoption through subsidies for wastewater treatment technologies.
- Provide tax benefits for renewable energy investments.
- Offer financial incentives for the use of recycled materials in packaging.
- Promote subsidies or grants for energy-efficient industrial equipment.
- Develop incentives for R&D in low-emission vehicle technologies.
- Mandate and incentivise telematics use for fleet operators.
- Establish renewable energy purchase obligations for s.
- Promote mandatory water audits and conservation practices in industries.
- Support green hydrogen projects with grants or low-interest financing.
- Provide R&D funding for CCS technologies.
- Implement long-term renewable energy policy roadmaps for high-emission industries.
- Establish public-private partnerships for energy storage advances

7. Key Findings and Conclusion

7.1. Summary of key findings

The key findings from the study are summarised below:

- It is observed that there is an overall marginal change in average absolute emissions, energy, and water consumption during the study period. The overall average emissions intensity, energy consumption intensity, and water consumption intensity show a significant reduction during the period, which reflects overall improvements in the companies' environmental footprint relative to their revenue per unit.
- A moderate increase in the GHG emissions intensity, energy consumption intensity, and water consumption intensity is observed during the pandemic period from 2019 to 2021. This trend has subsequently reversed, showing high improvements in 2021-22 and 2022-23.
- Pharma and Chemical companies have led in emissions intensity reduction. Many companies have reduced both absolute emissions and emissions intensity, showing marked improvements in their environmental impact.
- Leading Companies in Chemicals. Pharma and FMCG have achieved reductions in absolute energy and water consumption alongside significantly decreased intensity. Despite growth in absolute energy and water consumption, Metal Companies have shown improvements in consumption intensities.
- FMCG Companies exhibit exceptional financial performance in both accounting and market-based measures, Return on Equity (ROE), Return on

Assets (ROA), Price-to-Book Ratios (PB), and Tobin's Q, demonstrating strong financial health.

- Leaders in Chemicals, Metals and Oil & Gas sectors reflect good sectoral financial performance across all SFP measures, reflecting profitability and market valuation, whereas mid performers in Metals and Oil & Gas display significant fluctuations in market perception.
- Leaders in Chemicals and Oil & Gas lead in revenue growth, while laggards show low revenue growth. Laggards in the Automobile sector struggle with negligible to negative revenue growth over the five years.
- Many Companies that show significant improvements in Corporate Sustainability Environmental Performance (CESP), evidenced by reductions in their GHG emissions intensity, energy consumption intensity, and water consumption intensity per unit of revenue, exhibited better sustained financial performance (SFP). These companies reported higher Return on Equity (ROE), Return on Assets (ROA), price-to-book ratio (P/B), and Tobin’s Q (TQ).
- A strong positive correlation exists between high sustainability efforts on all three dimensions (reduction in GI, EI, WI) and financial performance (high ROE, ROA, PB, and TQ) for leaders in Chemicals, Metals, Oil & Gas, Others, and Automobile. Conversely, laggards in the Automobile and Oil & Gas lag in both areas, showing room for improvement. Outliers in FMCG and Pharma exhibited strong financial performance despite minimal sustainability improvements, while Metal Company showed high reductions in environmental metrics but weak financial outcomes

- The Chemicals, Cement, and Oil & Gas Sectors show a strong positive correlation between CESP metrics and SFP. The Metals and Healthcare sectors display varied correlations, with some negative correlations.
- The Auto Sector shows moderate correlations. The FMCG sector presents mixed relationships between sustainability efforts and financial success, with two companies showing strong financial outcomes despite moderate to low CESP.
- The Others (diversified) Sector companies show diverse correlations, with strong positive correlations between some metrics.
- Sectoral leadership analysis shows that leading Companies in the Chemicals, Meals, Oil & Gas, Others and Automobiles show that strong environmental management can drive superior financial outcomes, serving as leaders in their respective industries.
- Laggards in Oil & Gas, Metals and Automobiles and M4 face challenges in integrating sustainability practices into financial success.
- The financial benefits of sustainability efforts are more pronounced in resource-intensive industries, where neglecting sustainability can result in financial risks, as seen in lagging companies.

The sectoral analysis shows the following insights :

Chemicals Sector:

The CESP leader exhibits a strong performance in sustainability metrics (CAGR GI, EI, WI) and financial metrics (ROE, ROA, PB, TQ). It shows a direct positive relationship between sustainability efforts and financial returns. CESP mid performer shows moderate sustainability performance, particularly in energy and water efficiency, but maintains strong revenue growth. Laggard in this sector

struggles in both CESP and SFP, indicating operational challenges. Its sustainability and financial performance are well below sector averages.

Oil & Gas Sector:

CESP Leader shows solid reductions in environmental metrics and strong financial performance. It balances sustainability with high revenue growth and profitability. Mid performer has moderate sustainability efforts but struggles with low ROE, ROA, and market valuation, reflecting profitability challenges. Laggard underperforms in financial metrics, showing significant room for improvement in integrating sustainability into its business model and improving market perception.

Metals Sector:

CESP leader stands out with strong performance in both environmental and financial metrics, showing that sustainable practices can correlate with high returns. Mid performer shows low sustainability efforts but a strong Price-to-book ratio, indicating that market valuation drives financial performance despite sustainability efforts lagging.

SFP laggard has strong sustainability efforts, but needs to improve with low financial returns, indicating a disconnect between its environmental practices and financial outcomes. SFP laggard shows high revenue growth but lags in sustainability, profitability, and market valuation, showing challenges in balancing environmental concerns with profitability.

FMCG Sector:

SFP Leader excels with strong financial returns (high ROE, ROA, PB) and moderate sustainability efforts, showing that even with average sustainability

practices, financial outcomes can be robust. CESP Leader exhibits strong sustainability efforts with reductions in emissions, energy, and water usage, but has relatively moderate financial returns, indicating that its environmental efforts may be impacting financial gains. CESP laggard has a strong financial position with a lower emphasis on sustainability, highlighting a weak or negative correlation between CESP and SFP in this sector.

Healthcare Sector:

CESP Leader has strong sustainability performance with significant emissions, energy, and water consumption reductions, but moderate financial returns. Its sustainability efforts are well-integrated into its operations. shows good sustainability performance, especially in water efficiency, but its financial returns remain below average, indicating challenges in converting sustainability efforts into market gains. P1 shows moderate performance across all metrics, with moderate stainability and financial performance.

Auto Sector:

CESP leader shows significant reductions in emissions and strong financial performance, showing that sustainability can drive profitability and market valuation. Mid performers show varied sustainability efforts with moderate to financial performance, indicating that operational efficiency improvements have yet to translate into profitability. Laggard shows minimal sustainability efforts with poor financial performance.

Cement Sector:

Both companies show poor sustainability performance, particularly in energy and water efficiency. Their financial performance is mixed, with one company

faring slightly better in profitability while the other shows better revenue growth. The sector faces significant environmental challenges due to the nature of its operations, and there is substantial room for improvement in integrating sustainability practices with financial success.

Others (Diversified Sector):

The CESP leader excels across sustainability and financial performance metrics, demonstrating that strong environmental management can align with high market valuation and profitability. Laggard performs poorly on both sustainability and financial metrics, highlighting significant challenges in managing environmental impact and profitability. Mid performer shows moderate performance in both areas, indicating a need for improvement in integrating sustainability into its business model to enhance financial outcomes.

7.2. Hypothesis Testing

The hypothesis testing results reveal a statistically significant and moderately positive relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) across the selected companies. Companies with stronger sustainability metrics—lower energy, water, and emissions intensity—tend to show better financial outcomes. High-CESP firms significantly outperform low-CESP peers in financial rank. Sector-level ordinal regressions indicate that this relationship is particularly strong in high environmental impact industries, while no significant effect is observed in low-impact sectors.

7.3. Theoretical Contributions

The study on the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) among the 30 non-financial and non-service NSE 50 companies contributes to the existing body of knowledge in several ways. This study makes theoretical contributions by bridging gaps in emerging market contexts, providing sector-specific insights, integrating quantitative and qualitative data, identifying key sustainability practices, aligning with the SDGs, and offering policy recommendations.

Contribution to Sustainable Development Goals (SDGs):

The study aligns with the broader agenda of the United Nations Sustainable Development Goals (SDGs), particularly SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). By demonstrating the financial viability of sustainability initiatives, the research supports integrating these goals into corporate strategies (UNDP, 2015). This alignment provides a theoretical foundation for the role of businesses in achieving global sustainability targets, emphasising the interconnectedness of corporate practices and broader societal goals.

Integrating Environmental Performance into Strategic Value Creation

These findings reinforce the relevance of **Stakeholder Theory**, which posits that companies addressing environmental concerns tend to gain legitimacy, trust, and long-term support from stakeholders, including customers, investors, regulators, and communities. The positive association between CESP and SFP suggests that firms actively managing their sustainability obligations are rewarded with

stronger financial performance, aligning with this theory. From an Institutional Theory lens, the significant results in high environmental impact sectors indicate that institutional pressure, such as regulatory norms, market expectations, and peer influence, drives firms toward environmental accountability, which translates into financial gains. The Resource-Based View (RBV) is supported by the finding that firms with robust sustainability systems convert these into strategic capabilities that are valuable, rare, and hard to imitate, offering a sustained competitive advantage.

Sustainable Corporate Practices

The study provides insights for companies and policymakers aiming to enhance sustainability and financial outcomes. These findings highlight the importance of integrating sustainability into corporate strategy and policy. The study identifies sustainability practices that impact financial performance, such as emissions management, energy efficiency, and water conservation. These findings contribute to the growing body of knowledge on the mechanisms through which sustainability practices affect financial outcomes.

Environmental performance and Financial Performance linkage

This analysis contributes to understanding the link between sustainability practices and financial performance, highlighting the benefits of proactive environmental management.

This study addresses an important gap in the literature by providing a framework for studying the relationship between CESP and SFP in an emerging market, specifically India. Previous studies have focused on developed economies,

leaving a gap in understanding how these dynamics play out in developing countries (Alshehhi et al., 2018; Ameer & Othman, 2012).

Sectoral insights

This study conducts a sector-specific analysis and provides insights into how different industries manage environmental sustainability and achieve financial performance. It contrasts the experiences of high and low-environmental-impact sectors, shedding light on sector-specific dynamics (Busch & Friede, 2018; Eccles et al., 2014). These insights can help refine theoretical frameworks that consider industry-specific factors affecting the relationship between sustainability and financial performance, leading to more nuanced and accurate models central to strategic firm value creation.

7.4. Limitations of the Study

While this study provides valuable insights into the relationship between Corporate Environmental Sustainability Practices (CESP) and Sustained Financial Performance (SFP), limitations must be acknowledged to offer a balanced perspective.

Data Availability and Quality:

The study relies on available data for a specific set of companies, which may not represent the entire industry or global practices. Companies with incomplete or inconsistent data were excluded, potentially biasing the sample.

Sample selection:

The study focuses on the 30 non-financial and non-service companies listed on the NSE 50. While this provides a snapshot of large companies, it may not represent the broader corporate landscape in India or other emerging markets.

The findings may not generalise to smaller companies, other industries, or companies in different geographical regions. The small sample size per sector constrained the application of advanced statistical tests. Expanding the sample size, including a more diverse range of companies, and combining it with advanced statistical analysis could provide a more comprehensive view.

Data Quality:

Variations in the quality and accuracy of reported sustainability and financial metrics can affect the reliability of the analysis. Differences in reporting standards and practices across companies and regions can lead to inconsistency.

Short Time Frame:

The analysis primarily focuses on a relatively short time frame, which may not capture long-term trends and the full impact of sustainability practices on financial performance. Sustainability initiatives require extended time frames to show their full effects on financial outcomes. Extending the analysis period could offer deeper insights into the long-term benefits of sustainability.

Sector Variability:

The study aggregates companies into broad sectors, potentially overlooking significant intra-industry variations. Different sub-sectors within the same industry may face unique challenges and opportunities related to sustainability practices.

Measurement and Metrics:

The choice of metrics for CESP and SFP only encompasses some relevant sustainability and financial performance dimensions. Alternative or additional metrics could provide a more holistic view. The study measures CESP using

specific emissions, energy, and water intensity metrics. These metrics may not capture the full spectrum of sustainability practices and their impacts. The study does not consider Scope 3 emissions, which are indirect emissions from a Company's operations. Metrics related to the use of renewable energy, waste management, and recycling were omitted from the study due to the unavailability of consistent data for the study period.

Causality and Correlation:

While the study identifies correlations between CESP and SFP, it does not establish causality between them. The observed relationships may be influenced by other factors not accounted for in the analysis, such as economic conditions, the effect of size, capital structure, regulatory changes, and market dynamics. There is a potential for reverse causality, where financially successful companies have more resources to invest in sustainability practices rather than sustainability practices leading to financial success.

External Factors:

The analysis does not fully account for external economic and market conditions that can significantly impact financial performance and sustainability practices. For example, global economic downturns or industry-specific crises can skew results.

Acknowledging these limitations is important for interpreting the findings of this study. Future studies should address these limitations to enhance the robustness and generalisability of the findings. This can help the researchers contribute to a more comprehensive and nuanced understanding of how sustainability practices impact financial performance across different contexts and over longer times.

7.5. Directions for Future Research

Building on the findings and acknowledging this study's limitations, several directions for future research can be identified. These directions aim to deepen the understanding of the relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) and address the gaps identified in the current study.

- Expand the sample size to include a broader range of companies, including smaller firms and those from different industries and regions. A more extensive and diverse sample, complemented with advanced statistical techniques, will enhance the generalisability of the findings and help identify sector-specific and regional variations in the relationship between CESP and SFP (Eccles et al., 2014; Busch & Friede, 2018).
- Sustainability initiatives take time to yield financial benefits. Longitudinal studies can provide deeper insights into the enduring effects of these initiatives on financial performance (Orlitzky et al., 2003). Such studies can be conducted over longer periods to capture the long-term impacts of sustainability practices on financial performance.
- Include broader sustainability metrics beyond emissions, energy, and water intensity. Consider factors such as Scope 3 emissions, biodiversity, renewable energy, waste management, and social impacts. This approach will capture the full spectrum of corporate sustainability efforts (Guenster et al., 2011).
- Conduct comparative studies across different regions to understand how cultural, regulatory, and economic contexts influence the relationship

between CESP and SFP. This will help develop region-specific strategies and policies (Hart & Milstein, 2003).

- Include primary qualitative data by interviewing corporate executives, sustainability managers, and other stakeholders. In-depth case studies of companies with high sustainability practices can also be valuable. Interviews and case studies can reveal the motivations, challenges, and strategic decisions behind sustainability initiatives (Creswell & Plano Clark, 2017).
- Future research can leverage content analysis techniques such as thematic content analysis and tools, such as RQDA, CAT Scanner, etc that can be used to provide robust and validated insights.
- Investigate the impact of regulatory and policy changes on corporate sustainability practices and financial performance. This can include studying the effects of new environmental regulations, tax incentives, and international agreements. This research can inform policymakers and corporate strategists.
- Explore the role of emerging technologies and innovations in driving sustainability and financial performance. This includes studying the impact of digital technologies, artificial intelligence, and blockchain in enhancing sustainability practices. Researching these innovations can provide insights into new opportunities and challenges in sustainability management.

Future research should build on the current study's findings by expanding the sample size, incorporating longer times, including a broader range of sustainability metrics, and conducting comparative studies across regions. Additionally, incorporating qualitative data through interviews and case studies, investigating the impact of regulatory changes, and exploring the role of

technology in sustainability can provide deeper and more comprehensive insights. These directions will contribute to a more nuanced understanding of how corporate sustainability practices impact financial performance and inform strategies for enhancing sustainability and financial outcomes.

7.6. Conclusion

The study highlights a growing commitment to environmental sustainability by Indian companies, with substantial variations in the rate of improvement across different sectors and companies. The relationship between Corporate Environmental Sustainability Performance (CESP) and Sustained Financial Performance (SFP) is complex and multifaceted. The analysis revealed a positive relationship between corporate environmental sustainability performance and sustained financial performance in many sectors. Companies with higher Corporate Environmental Sustainability Performance (CESP) have higher Sustained Financial Performance (SFP) than their peers, indicating that robust environmental practices align with superior financial outcomes.

There is a high correlation between reductions in CESP in the reported intensity of GHG emissions, energy consumption, and water consumption, showing that companies reporting higher environmental performance improvements exhibit improvements across all the CESP metrics. This indicates a deliberate, sustained, and strategic focus on sustainable outcomes by the leaders. This aligns with Jody Grewal and George Serafeim's (Grewal & Serafeim, 2020) views on corporate sustainability as an intentional strategy to create long-term financial value through measurable societal impact.

The strength of this correlation varies between environmentally sensitive or high environmental impact sectors and non-environmentally sensitive or low environmental impact sectors. Sectors like cement, oil and gas, chemicals, and metals have inherent environmental challenges, which impact their sustainability metrics and financial outcomes differently than sectors like FMCG and healthcare. Non-environmentally sensitive or low environmental impact sectors show a moderate to mixed correlation between CESP and SFP due to fewer regulatory hurdles and less complex environmental impact. This is in line with the research that investments in material sustainability issues can enhance shareholder value, while investments in less important areas tend to have a neutral impact (Khan et al., 2015).

There is a positive correlation between sustainability efforts (CAGR GI, EI, WI) and financial returns (ROE, ROA, PB, TQ) in high-impact sectors, while in low-impact sectors, the relationship is weaker, with companies showing strong financial returns even with lower sustainability efforts.

The research highlights the financial benefits of integrating sustainability into core business strategies. The results confirm previous studies' findings that companies with a high focus on sustainability significantly outperform their low-sustainability counterparts regarding stock market performance and accounting measures (Eccles et al., 2014).

This confirms the past study findings that sustainability performance is intricately linked to business competitiveness and economic performance (Schaltegger & Wagner, 2006). Companies that excel in environmental sustainability can differentiate themselves in the market, leading to improved brand reputation and customer loyalty (Porter & Kramer, 2006).

This research also shows that companies with low CESP experience a negative relationship between CESP and SFP. This finding aligns with the theoretical framework, indicating that firms with low environmental performance adopt a reactive strategy towards environmental initiatives, leading to additional costs and significant organisational changes that temporarily reduce efficiency and profitability. In contrast, firms that pursue a proactive environmental strategy, equipped with the necessary resources and capabilities to meet new regulations or market pressures, can achieve a competitive advantage, resulting in superior environmental and financial performance. (Trumpp & Guenther, 2017)

Improving CESP positively influences various financial metrics, from reducing costs and risks to driving revenue growth and innovation. Companies that invest in sustainability enhance their environmental impact and build a more resilient, profitable, and valuable business. The relationship between CESP and financial performance highlights the importance of integrating sustainability into the core business strategy. Focusing on sustainability outcomes can lead to cost savings, operational efficiencies, and enhanced corporate reputation, collectively contributing to improved financial performance (Alshehhi et al., 2018; Ameer & Othman, 2012).

Sectors like Auto, Chemicals, Metals, Oil and gas, and Others have companies that are leaders in both CESP and SFP. This indicates that companies in these sectors prioritising sustainability achieve strong financial results.

The specific sectors and industry-specific factors influence the relationship between environmental performance and financial performance. (Schaltegger, 2002) (Clarkson et al., 2011). Leaders across all sectors show that a commitment to sustainability can drive financial success, setting them apart from their peers.

Companies that consistently rank high across financial and sustainability metrics exemplify how strong environmental management can lead to superior financial outcomes and set industry benchmarks. Mid-performers have the potential to improve, while laggards risk falling further behind if they do not address their environmental and financial challenges. Mid-performers show good performance but have areas requiring enhancement in sustainability integration, capitalising on financial returns fully.

Laggards face significant challenges in both financial performance and sustainability efforts. These companies need to adopt aggressive sustainability strategies to improve their rankings and market positions. The Cement sector stands out as needing more leaders in CESP and SFP, indicating potential challenges in aligning sustainability efforts with financial performance in this sector.

The research highlights best practices, challenges, and strategic implications, and the findings provide valuable insights for companies and policymakers aiming to enhance sustainability and financial outcomes. Companies that lead in sustainability can also achieve better financial outcomes and improve their brand reputation, stakeholder engagement, and overall business resilience. Policymakers and industry leaders should collaborate to promote sustainable practices, leveraging regulatory support and public-private partnerships. By integrating sustainability into their core strategies, companies can achieve long-term growth, mitigate environmental impacts, and contribute to a more sustainable future. The findings offer valuable insights for corporate strategy, policy formulation, and theoretical research on the sustainability-performance link. This study has been successful in generating new insights and contributions,

especially in the Indian corporate sustainability context. It serves as a beneficial and topical study with indications to researchers, s, policymakers, and regulatory authorities.

8. References

Aaker, D. A. (1992). Managing the most important asset: Brand equity. *Planning Review*, *20*(5), 56–58. https://doi.org/10.1108/eb054384

Adams, W. M. (n.d.). The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century.

Alshehhi, A., Nobanee, H., & Khare, N. (2018). The Impact of Sustainability Practices on Corporate Financial Performance: Literature Trends and Future Research Potential. *Sustainability*, *10*(2), Article 2. https://doi.org/10.3390/su10020494

Ameer, R., & Othman, R. (2012). Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global. *Journal of Business Ethics*, *108*. https://doi.org/10.1007/s10551-011-1063-y

Barney, J., Wright, M., & Ketchen, D. (2001). The Resource-Based View of the Firm. *Journal of Management*, *27*. https://doi.org/10.1177/014920630102700601

Bonini, S., Koller, T. M., & Mirvis, P. (2009). Valuing Social Responsibility Programs. *McKinsey Quarterly*, *32*, 11–18.

Brammer, S., & Pavelin, S. (2006). Corporate Reputation and Social Performance: The Importance of Fit. *Journal of Management Studies*, *43*, 435–455. https://doi.org/10.1111/j.1467-6486.2006.00597.x

Brealey, R., Myers, S., & Allen, F. (2008). Brealey, Myers, and Allen on Valuation, Capital Structure, and Agency Issues. *Journal of Applied Corporate Finance*, *20*, 49–57. https://doi.org/10.1111/j.1745-6622.2008.00203.x

Busch, T., & Friede, G. (2018). The Robustness of the Corporate Social and Financial Performance Relation: A Second-Order Meta-Analysis: Corporate social and financial performance. *Corporate Social Responsibility and Environmental Management*, *25*. https://doi.org/10.1002/csr.1480

Clarkson, P., OVERELL, M., & Chapple, L. (2011). Environmental Reporting and Its Relation to Corporate Environmental Performance. *Abacus*, *47*, 27–60. https://doi.org/10.1111/j.1467-6281.2011.00330.x

Cochran, P. L., & Wood, R. A. (1984). Corporate Social Responsibility and Financial Performance. *The Academy of Management Journal*, *27*(1), 42–56. https://doi.org/10.2307/255956

Donaldson, T., & Preston, L. E. (1995). The Stakeholder Theory of the: Concepts, Evidence, and Implications. *Academy of Management Review*, *20*, 65–91.

Dowell, G., Hart, S., & Yeung, B. (1999). Do Corporate Global Environmental Standards in Emerging Markets Create Or Destroy Market Value? *Management Science*, *46*. https://doi.org/10.1287/mnsc.46.8.1059.12030

Dyllick, T., & Hockerts, K. (2002). Beyond the Business Case for Corporate Sustainability. *University of St.Gallen*, *11*. https://doi.org/10.1002/bse.323

Eccles, R., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organisational Processes and Performance. *Management Science*, *60*, 2835–2857. https://doi.org/10.1287/mnsc.2014.1984

Elkington, J. (1998). ACCOUNTING FOR THE TRIPLE BOTTOM LINE. *Measuring Business Excellence*, *2*(3), 18–22. https://doi.org/10.1108/eb025539

Fama, Eugene F, & French, Kenneth R, (1992). 'The Cross-Section of Expected Stock Returns,' Journal of Finance, American Finance Association, vol. 47(2), pages 427-465, June. (n.d.).

Filbeck, G., & Gorman, R. (2004). The Relationship between the Environmental and Financial Performance of Public Utilities. *Environmental & Resource Economics*, *29*, 137–157. https://doi.org/10.1023/B:EARE.0000044602.86367.ff

Glavas, A. (2012). What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda. *Journal of Management*, *38*, 932– 968. https://doi.org/10.1177/0149206311436079

Gleick, P. (2011). The World's Water, Vol. 7, The Biennial Report on Freshwater Resources. *SERBIULA (Sistema Librum 2.0)*. https://doi.org/10.5822/978-1- 61091-483-3

Greening, D., & Turban, D. (2000). Corporate Social Performance As A Competitive Advantage In Attracting A Quality Workforce. *Business & Society - BUS SOC*, *39*, 254–280. https://doi.org/10.1177/000765030003900302

Grewal, J., & Serafeim, G. (2020). Research on Corporate Sustainability: Review and Directions for Future Research. *Foundations and Trends® in Accounting*, *14*(2), 73–127. https://doi.org/10.1561/1400000061

Gutterman, A. (2022). Corporate Sustainability.

Hall, B., & Lerner, J. (2010). *The Financing of R&D and Innovation* (Vol. 1, pp. 609–639). Elsevier. https://EconPapers.repec.org/RePEc:eee:haechp:v1_609

Hamilton, J. T. (1995). Pollution as News: Media and Stock Market Reactions to the Toxics Release Inventory Data. *Journal of Environmental Economics and Management*, *28*(1), 98–113. https://doi.org/10.1006/jeem.1995.1007

Hart, S., & Ahuja, G. (1996). Does It Pay To Be Green? An Empirical Examination of the Relationship between Emission Reduction And Firm Performance. *Business Strategy and the Environment*, *5*, 30–37. https://doi.org/10.1002/(SICI)1099-0836(199603)5:1<30::AID-BSE38>3.0.CO;2-Q

Hart, S., & Milstein, M. (2003). Creating Sustainable Value. *Academy of Management Executive*, *17*. https://doi.org/10.5465/AME.2003.10025194

Hillman, A. J., & Keim, G. D. (2001). Shareholder Value, Stakeholder Management, and Social Issues: What's the Bottom Line? *Strategic Management Journal*, *22*(2), 125–139.

Hinrichsen, Don. Our Common Future: A Reader's Guide. The 'Brundtland Report' Explained. London: Earthscan Ltd., 1987

Higgins, R. C. (2012). International Financial Statements and Analysis. New York: McGraw-Hill.

Hull, C., & Rothenberg, S. (2008). Firm Performance: The Interactions of Corporate Social Performance with Innovation and Industry Differentiation. *Strategic Management Journal*, *29*, 781–789. https://doi.org/10.1002/smj.675

Jenkins, H., & Yakovleva, N. (2006). Corporate Social Responsibility in the Mining Industry: Exploring Trends in Social and Environmental Disclosure.

Journal of Cleaner Production, *14*, 271–284. https://doi.org/10.1016/j.jclepro.2004.10.004

Jha, M. K., & Rangarajan, K. (2020). Analysis of corporate sustainability performance and corporate financial performance causal linkage in the Indian context. *Asian Journal of Sustainability and Social Responsibility*, *5*(1), 10. https://doi.org/10.1186/s41180-020-00038-z

Keller, K. L. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. *Journal of Marketing*, *57*(1), 1–22. https://doi.org/10.1177/002224299305700101

Khan, M., Serafeim, G., & Yoon, A. (2015). Corporate Sustainability: First Evidence on Materiality. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2575912

Kim, S., & Li, F. (2021). Understanding the Impact of ESG Practices in Corporate Finance. *Sustainability*, *13*, 3746. https://doi.org/10.3390/su13073746

King, A., & Lenox, M. (2001). Does It Really Pay to Be Green? An Empirical Study of Firm Environmental and Financial Performance. *Journal of Industrial Ecology*, *5*, 105–116. https://doi.org/10.1162/108819801753358526

Klassen, R., & McLaughlin, C. (1996). The Impact of Environmental Management on Firm Performance. *Management Science*, *42*, 1199–1214. https://doi.org/10.1287/mnsc.42.8.1199

Larrinaga, C., Bebbington, J., & Moneva, J. (2008). Corporate Social Reporting and Reputation Risk Management. *Accounting, Auditing & Accountability Journal*, *21*, 337–361. https://doi.org/10.1108/09513570810863932

Lyon, T., & Maxwell, J. (2006). Greenwash: Corporate Environmental Disclosure Under Threat of Audit. *Indiana University, Kelley School of Business, Department of Business Economics and Public Policy, Working Papers*, *20*. https://doi.org/10.1111/j.1530-9134.2010.00282.

Manrique, S.,let me & Martí-Ballester, C. (2017). Analysing the Effect of Corporate Environmental Performance on Corporate Financial Performance in Developed and Developing Countries. Sustainability, 1957.https://doi.org/10.3390/su9111957

Miles, M. & Cavin. (2000). Miles, M., & Covin, J. (2000). "Environmental Marketing: A Source of Reputational, Competitive, and Financial Advantage," Journal of Business Ethics, 23(3): 299–311. Journal of Business Ethics, 23, 299–311. https://doi.org/10.1023/A:1006214509281

Orlitzky, M., Schmidt, F., & Rynes, S. (2003). Corporate Social and Financial Performance: A Meta-Analysis. *Organisation Studies*, *24*. https://doi.org/10.1177/0170840603024003910

Patten, D. M. (2002). The relation between environmental performance and environmental disclosure: A research note. *Accounting, Organizations and Society*, *27*(8), 763–773. https://doi.org/10.1016/S0361-3682(02)00028-4

Pazienza, M., de Jong, M., & Schoenmaker, D. (2022). Clarifying the Concept of Corporate Sustainability and Providing Convergence for Its Definition. *Sustainability*, *14*(13), Article 13. https://doi.org/10.3390/su14137838

Porter, M. E., & Linde, C. V. D. (1995). Toward a New Conception of the Environment-Competitiveness Relationship. *Journal of Economic Perspectives*, *9*(4), 97–118. https://doi.org/10.1257/jep.9.4.97

Porter, M., & Kramer, M. (2007). Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*, *84*, 78–92, 163.

Przychodzen, J., & Przychodzen, W. (2015). Relationships between eco-innovation and financial performance—Evidence from publicly traded companies in Poland and Hungary. *Journal of Cleaner Production*, *90*. https://doi.org/10.1016/j.jclepro.2014.11.034

Ramanathan, U. (2014). Performance of supply chain collaboration – A simulation study. *Expert Systems with Applications*, *41*(1), 210–220. https://doi.org/10.1016/j.eswa.2013.07.022

Russo, M., & FOUTS, P. (1997). Russo M. V., P. A. Fouts: 1997, A Resource-Based Perspective on Corporate Environmental Performance and Profitability. Academy of Management Journal. *Academy of Management Journal*, *40*. https://doi.org/10.2307/257052

Sachs, J. D. (2015). The age of sustainable development. Columbia University Press.

Schaltegger, S. (2002). The link between 'green' and economic success: Environmental management as an important trigger between environmental and economic performance. *Journal of Environmental Management*, *65*, 339–346. https://doi.org/10.1016/S0301-4797(02)90555-4

Schaltegger, S., & Wagner, M. (2006). Integrative Management of Sustainability Performance, Measurement and Reporting. *International Journal of Accounting, Auditing and Performance Evaluation*, *3*, 1–19. https://doi.org/10.1504/IJAAPE.2006.010098

Scott, W. (2001). Institutions and Organisations

Shleifer, A., & Vishny, R. W. (1996). *A Survey of Corporate Governance* (SSRN Scholarly Paper 10182). https://papers.ssrn.com/abstract=10182

Sudha, S. (2020). Corporate environmental performance–financial performance relationship in India using eco-efficiency metrics. *Management of Environmental Quality: An International Journal*, *ahead-of-print*. https://doi.org/10.1108/MEQ- 01-2020-0011

Trumpp, C., & Guenther, T. (2017). Too Little or too much? Exploring U-shaped Relationships between Corporate Environmental Performance and Corporate Financial Performance. *Business Strategy and the Environment*, *26*(1), 49–68. https://doi.org/10.1002/bse.1900

United States Environmental Protection Agency. (n.d.). Learn about sustainability. U.S. Environmental Protection Agency. https://www.epa.gov/sustainability/learn-about-sustainabilityWaddock,

S. A., & Graves, S. B. (1997). The Corporate Social Performance- Financial Performance Link. *Strategic Management Journal*, *18*(4), 303–319.

Tobin, J. (1969). A General Equilibrium Approach to Monetary Theory. Journal of Money, Credit & Banking, 1, 15–29.

Brigham, E.F. & Ehrhardt, M.C. (2013). Financial Management: Theory & Practice. Cengage Learning.

Designing and Conducting Mixed Methods Research, Third Edition, 2017. John W. Creswell - Department of Family Medicine, the University of Michigan Vicki L. Plano Clark - University of Cincinnati, OH, USA

Damodaran, A. (2012). Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. 3rd Edition, Wiley, Hoboken.

Corporate Finance - 4th Global Edition Jonathan Berk & Peter DeMarzo, 2007Freeman, R. E. (1984). Strategic management: A stakeholder approach. Boston, MA: Pitman

Freeman, R. E., Harrison, J. S., & Wicks, A. C. (2007). Managing for stakeholders: Survival, reputation, and success. New Haven: Yale University Press.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & Colle, S. D. (2010). Stakeholder theory: The state of the art. UK: Cambridge University Press.

Freeman, R. E. (1983). Strategic management: A stakeholder approach. Advances in the Journal of Business Ethics.

Freeman, R. E., & McVea, I. (2001). A stakeholder approach to strategic management. In Hitt, M.

McKinsey Global Institute. (2022). "Performance through people: Transforming human capital into competitive advantage" (Appendix). McKinsey & Company. https://www.mckinsey.com/~/media/mckinsey/mckinsey%20global%20institute/our%20research/performance%20through%20people%20transforming%20human%20capital%20into%20competitive%20advantage/appendix-performance-through-people.pdf

Moskowitz, M. (1972). Choosing Socially Responsible Stocks. Business & Society Review, 1, 71-75.

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Rosewicz, Barbara. 1990. Americans Are Willing to Sacrifice to Reduce Pollution, They Say. Wall Street Journal, April 20, 1990, A1.

Schmidheiny, S. (1992). Changing Course: A Global Business Perspective on Development and the Environment. MIT Press, Cambridge.

Bonini, S., & Swartz, S. (2014). Profits with Purpose: How Sustainability Can Benefit the Bottom Line. McKinsey on Sustainability and Resource Productivity, McKinsey and Company.

International Union for Conservation of Nature and Natural Resources, ed. World Conservation Strategy: Living Resource Conservation for Sustainable Development. IUCN–UNEP–WWF, 1980.

Exploring the Measurement of Environmental Performance in Alignment with Environmental, Social, and Governance (ESG): A Qualitative Study (C. Meiden & A. Silaban, 2023)

S.S. Das, R. Majumdar, A.V. Krishnan, R. Srikanth, 'Exploring Urban Water-Energy Nexus: A Case Study of Thermal Power Plants in Raichur and Ballari Districts in Karnataka', Natural Resources Forum – A UN Sustainable Development Journal, pp. 1–31, 2024. (IF: 3.3) DOI: 10.1111/1477-8947.12507

Companies (CSR Policy) Rules, 2014, notified on February 27, 2014, Gazette of India vide No. G.S.R. 129(E), dated 27.02.2014

Website links:

- *https://www.un.org/en/climatechange/science/causes-effects-climate-*

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- *https://www.globalreporting.org/standards/*
- *https://sasb.ifrs.org/standards/*
- *https://www.cdp.net/en/2024-disclosure/disclosure-frameworks-and-standards*
- *https://integratedreporting.orghttps://www.cdp.net/enhttps://www.sebi.gov.in/sebi_data/commondocs/may-2021/siness%20responsibility%20and%20sustainability%20reportig%20by%20listed%20entitiesAnnexure1_p.PDF*
- *https://unglobalcompact.org/sdgs*
- *https://sdgs.un.org/goals*
- *https://sciencebasedtargets.org/*